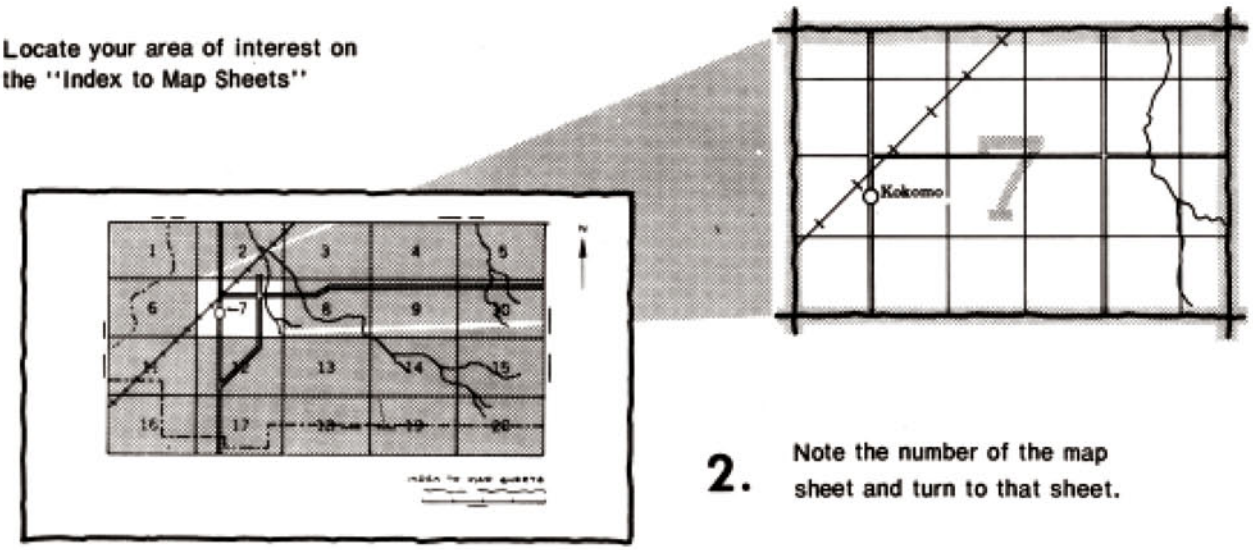
SOIL SURVEY OF
PUSHMATAHA COUNTY
OKLAHOMA

United States Department of Agriculture
Soil Conservation Service
in cooperation with
Oklahoma Agricultural Experiment Station

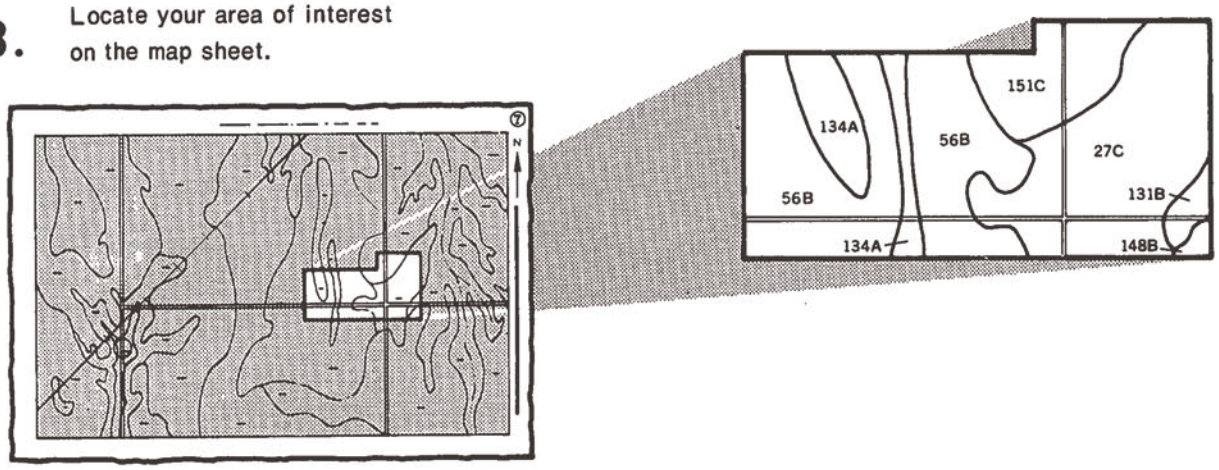
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets"

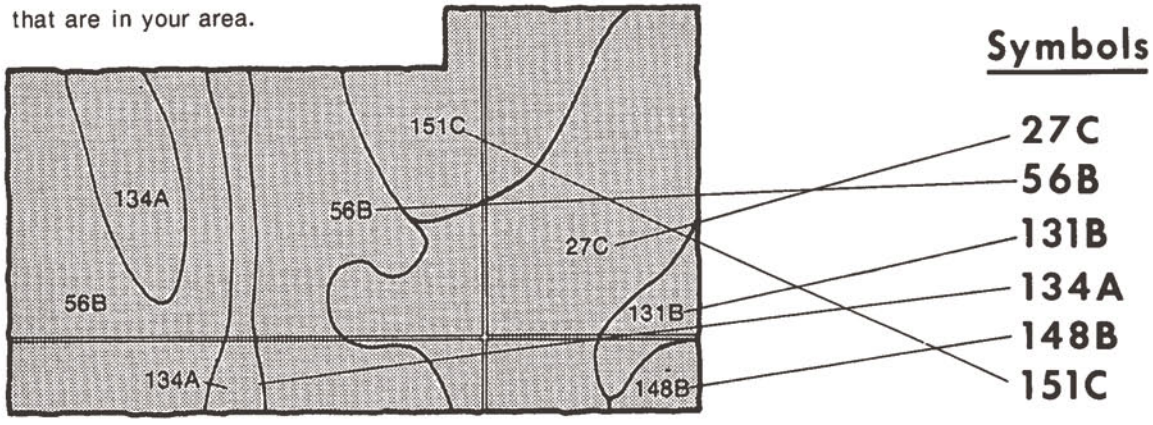


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.

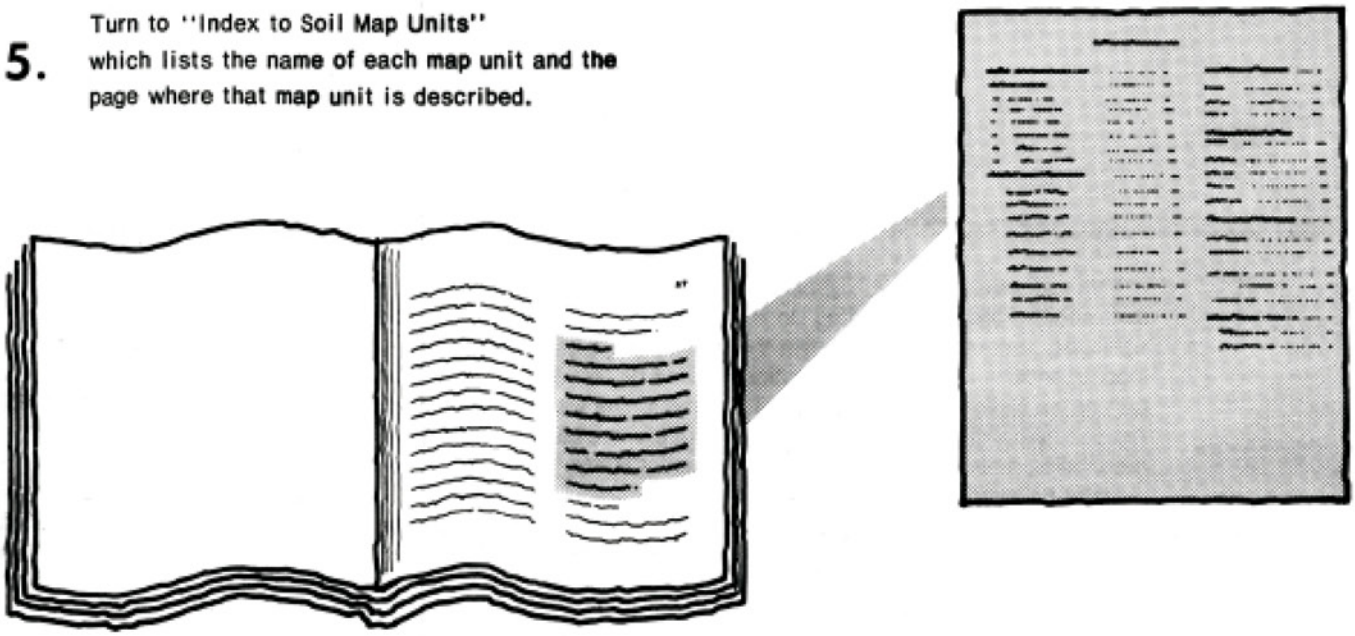


4. List the map unit symbols that are in your area.

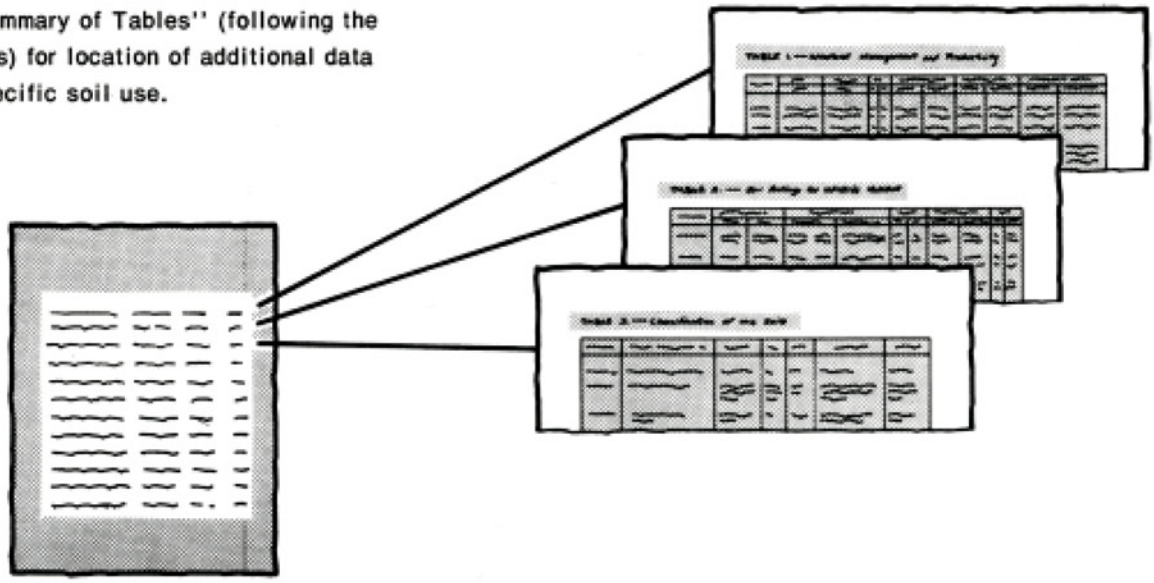


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1960-1977. Soil names and descriptions were approved in 1977. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1977. This survey was made cooperatively by the Soil Conservation Service and the Oklahoma Agricultural Experiment Station. It is part of the technical assistance furnished to the Pushmataha Conservation District and the Talihina Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover: The Kiamichi Mountains. In the valley are Dela fine sandy loams on the flood plain of the Kiamichi River.

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Issued November 1979

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Foreword

The Soil Survey of Pushmataha County contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

This soil survey has been prepared for many different users. Farmers, ranchers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

This soil survey can be useful in the conservation, development, and productive use of soil, water, and other resources.

Roland R. Willis

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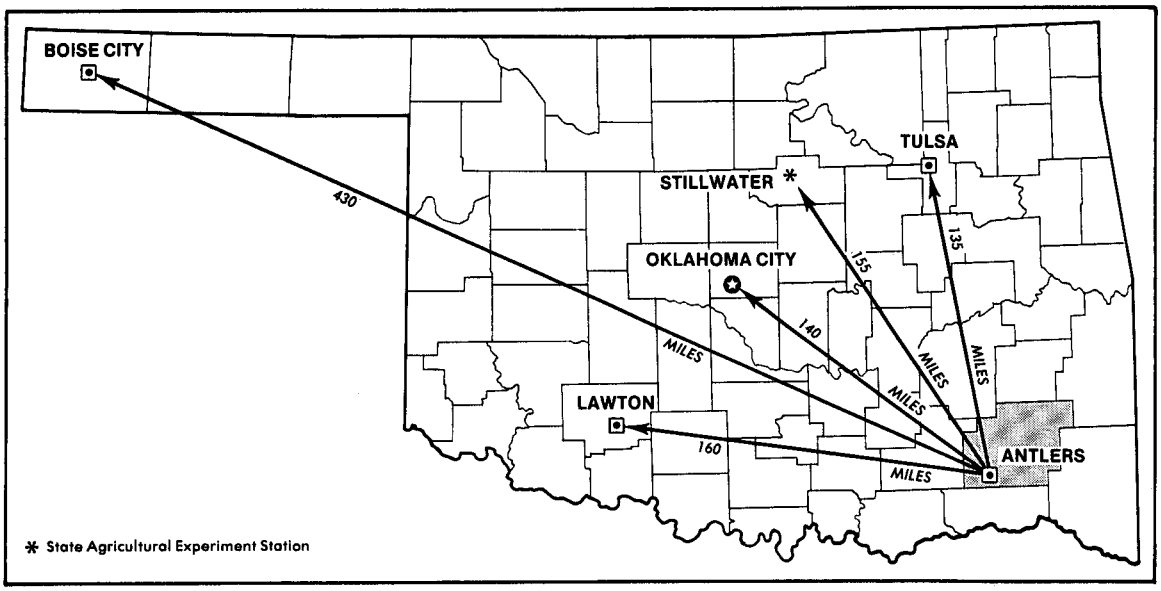
State Conservationist
Soil Conservation Service



Location of Pushmataha County in Oklahoma.

SOIL SURVEY OF PUSHMATAHA COUNTY, OKLAHOMA

By William R. Bain and Anderson Watterson, Jr., Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with
Oklahoma Agricultural Experiment Station

PUSHMATAHA COUNTY is in the southeastern part of Oklahoma. It has a total area of 910,720 acres, or 1,423 square miles.

About 85 percent of the county is in the Ouachita Mountains physiographic region, a series of timbered hills and valleys. The highest elevation is slightly more than 2,000 feet. About 15 percent is in the Southern Coastal Plain physiographic region, a landscape of rolling low hills. The lowest elevation is slightly less than 400 feet where the Kiamichi River leaves the county.

The topography of the county ranges from nearly level flood plains of the Kiamichi and Little Rivers and several creeks to the steep mountainous areas. The general slope is from north to south. The Kiamichi and Little Rivers drain most of the county.

Soil is the most basic natural resource in the county. Needleleaf and broadleaf trees are extensively marketed. The livestock that graze the timberland and grassland and the crops produced on farms also are marketable products derived from the soil.

In most of the county, water is adequate for domestic use and for livestock. Souces of sand and gravel are mostly in areas of Saffell and Ceda soils. The mountains provide recreation areas.

Climate

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Antlers, Oklahoma, for the period 1951 to 1974. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 44 degrees F, and the average daily minimum temperature is 31 degrees. The lowest temperature on record, which occurred at Antlers on February 2, 1951, is -10 degrees. In summer the average temperature is 80 degrees, and the average daily maximum temperature is 93 degrees. The highest recorded temperature, which occurred on August 6, 1956, is 111 degrees.

Growing degree days, shown in table 1, are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 28 inches, or 60 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 22 inches. The heaviest 1-day rainfall during the period of record was 6.18 inches at Antlers on October 31, 1972. Thunderstorms occur on about 50 days each year, and most occur in summer.

Average seasonal snowfall is 3 inches. The greatest snow depth at any one time during the period of record was about 11 inches. On the average, 5 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 50 percent. Humidity is higher at night, and the average at dawn is about 82 percent. The percentage of possible sunshine is 75 in summer and 55 in winter. The prevailing wind is from the south. Average windspeed is highest, 13 miles per hour, in March and April.

Climatic data in this section were specially prepared for the Soil Conservation Service by the National Climatic Center, Asheville, North Carolina.

Settlement and development

The early settlers in Pushmataha County were mostly Choctaw Indians. Land was allotted to the Choctaw Indi-

ans. Land could also be leased for farming under the supervision of the Indian Agency.

Most of the early settlers were subsistence farmers. Timber, cotton, grain sorghum, peanuts, and small grain were the major cash crops. Other crops were grown as feed for horses, mules, hogs, chickens, beef cattle, and milk cows.

In the last few decades, the trend has been toward larger and fewer farms. Land users are specializing in forest, crop, and livestock enterprises to increase efficiency in managing the larger farm units.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual map units on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called soil map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in the sections "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land use planning

The general soil map at the back of this publication shows, in color, map units that have a distinct pattern of soils and of relief and drainage. Each map unit is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

Each map unit is rated for *cultivated farm crops, woodland, urban uses,* and *pasture.* Cultivated farm crops are those grown extensively by farmers in the survey area. Woodland refers to land that is producing either trees native to the area or introduced species. Urban uses include residential, commercial, and industrial developments. Pasture refers to land that is producing introduced grasses.

1. Bernow-Larue-Romia

Deep, nearly level to strongly sloping, well drained soils that have a loamy or sandy surface layer and a loamy subsoil; on uplands

This map unit is west of the Kiamichi River in the southern part of the county. It makes up about 7 percent of the county. The unit is about 43 percent Bernow soils, 14 percent Larue soils, 9 percent Romia soils, and 34 percent soils of minor extent.

Bernow soils are very gently sloping to strongly sloping. Larue soils are nearly level to sloping. Romia soils are gently to strongly sloping. Bernow and Romia soils are loamy throughout. Larue soils have a sandy surface layer and a loamy subsoil.

Minor in this unit are Boggy, Bosville, Elysian, Glenpool, Hamden, Hollywood, Nahatche variant, Saffell, and Swink soils, Udorthents, and Wrightsville and other soils.

This map unit is used mainly for farming, pasture, and woodland. Most of the acreage has medium potential for farming and pasture. If cultivated, the very gently sloping to strongly sloping areas are subject to water erosion. They must be protected by crop residue and terraces to prevent excessive erosion. The unit has low potential for woodland. The potential for residential and other urban uses is high.

2. Dela-Guyton-Pushmataha

Deep, nearly level to very gently sloping, moderately well drained, poorly drained, and somewhat poorly drained soils that have a loamy surface layer and a loamy or sandy underlying layer; on flood plains and stream terraces

This map unit is along rivers and creeks throughout the county (fig. 1). It makes up about 8 percent of the county. The unit is about 31 percent Dela soils, 22 percent Guyton soils, 18 percent Pushmataha soils, and 29 percent soils of minor extent.

Dela soils are nearly level to very gently sloping and moderately well drained. They have a loamy surface layer and loamy or sandy underlying layers. They are on flood plains. Guyton soils are nearly level and poorly drained. They are loamy throughout, and are saturated in winter and in spring. They are on terraces. Pushmataha soils are nearly level and somewhat poorly drained. They are loamy throughout, and are saturated in winter and in spring. They are on flood plains. All of these soils are occasionally or frequently flooded.

Minor in this unit are Elysian, Rexor, Speer, Wrightsville, and other soils.

This map unit is used mostly for woodland, pasture, and farming. Most of the acreage has high potential for woodland and pasture and medium potential for farming. Flooding and the high water table are limitations to farming. The potential for residential and other urban use is low because of the flood hazard and the high water table.

3. Tuskahoma-Sherwood-Clebit

Shallow and deep, gently sloping to steep, moderately well drained and well drained soils that have a loamy surface layer and a loamy or clayey subsoil; on uplands

This map unit occurs throughout the Ouachita Mountains on valleys, side slopes, and ridges. It occupies about 20 percent of the county. The unit is about 25 percent Tuskahoma soils, 17 percent Sherwood soils, 14 percent Clebit soils, and 44 percent soils of minor extent.

Tuskahoma soils are shallow, strongly sloping, and moderately well drained. They generally occur on the valley side slopes. Sherwood soils are deep, very gently sloping to sloping, and well drained. They generally occur on crests. Clebit soils are shallow, strongly sloping to steep, and well drained. They generally occur on ridges.

Minor in this unit are Alikchi variant, Ceda, Shermore, Sobol, Yanush, and Zafra soils.

This unit is used mainly for pasture and woodland. Some small tracts are farmed. Most of the acreage has low potential for farming, woodland, and pasture. Soil depth and droughtiness are limitations. The potential for residential and other urban use is low. Depth to rock, shrink swell, and low strength are limitations.

4. Carnasaw-Pirum-Clebit

Deep, moderately deep, and shallow, strongly sloping to steep, well drained soils that have a loamy surface layer and a clayey or loamy subsoil; on uplands

This map unit is in the Ouachita Mountains throughout the county. It makes up about 53 percent of the county. The unit is about 28 percent Carnasaw soils, 22 percent Pirum soils, 18 percent Clebit soils, and 32 percent soils of minor extent.

Carnasaw soils are deep, Pirum soils are moderately deep, and Clebit soils are shallow. Carnasaw soils have a loamy surface layer and a clayey subsoil. Pirum and Clebit soils are loamy throughout.

Minor in this unit are Ceda, Sherwood, Shermore, Sobol, Stapp, and Tuskahoma soils, Rock outcrop, and Rubble land.

This unit is used mainly for woodland and pasture. Small tracts are farmed. Most of the acreage has low potential for farming and pasture and medium potential for woodland and recreational use. The potential for residential and other urban use is low. Stones, shrink swell, low strength, slow percolation, and slope are limitations that can be overcome by good design.

5. Honobia-Nashoba

Moderately deep, strongly sloping, well drained soils that have a loamy surface layer and a clayey or loamy subsoil; on uplands

This map unit is in the eastern part of the county in the Ouachita Mountains. It makes up 4 percent of the county. The unit is about 35 percent Honobia soils, 10 percent Nashoba soils, and 55 percent soils of minor extent.

Honobia soils have a loamy surface layer and a clayey subsoil. They have many stones and other coarse fragments throughout. Nashoba soils are loamy throughout and contain many stones and coarse fragments.

Minor in this unit are Carnasaw, Ceda, Clebit, Moyers, Sherwood, Shermore, Sobol, Tuskahoma, Zafra, and other soils, and Rubble land.

This unit is used mainly for woodland and pasture. Small tracts are farmed. Most of the acreage has low potential for farming, woodland, or pasture. The potential for residential and other urban use is low. Stones, shrink swell, low strength, and slow percolation are limitations that can be overcome by good design.

6. Sobol-Tuskahoma-Wister

Moderately deep, shallow, and deep, nearly level to strongly sloping, moderately well drained soils that have a loamy surface layer and a clayey subsoil; on uplands

This map unit is in the valleys of the Ouachita Mountains. It makes up about 3 percent of the county. This unit is about 26 percent Sobol soils, 15 percent Tuskahoma soils, 12 percent Wister soils, and 47 percent soils of minor extent.

Sobol soils are moderately deep and gently to strongly sloping. Tuskahoma soils are shallow and strongly sloping. Wister soils are deep and nearly level to gently sloping. Typically, these soils have a loamy surface and a clayey subsoil.

Minor soils in this unit are Burwell, Carnasaw, Ceda, Clebit, Moyers, Pirum, Shermore, Sherwood, Yanush, Zafra, and other soils.

This unit is used mostly for pasture. Small tracts are farmed. Most of the acreage has medium potential for farming and pasture and low potential for woodland. The potential for residential and other urban use is low. Slow percolation, shrink swell, and low strength are limitations that can be overcome by good design.

7. Yanush-Bigfork

Deep and moderately deep, very gently sloping to steep, well drained cherty and stony soils that have a loamy surface layer and a loamy subsoil; on uplands

This map unit is in the Potatoe Hills of the Ouachita Mountains. It makes up about 2 percent of the county. The unit is about 50 percent Yanush soils, 45 percent Bigfork soils, and 5 percent soils of minor extent.

Yanush soils are deep and very gently sloping to moderately steep. Bigfork soils are moderately deep and steep. Typically, both soils are loamy throughout, and both have chert fragments mixed throughout.

Minor in this unit are Ceda soils.

This unit is used mainly for woodland and pasture. Small tracts are farmed. Most of the acreage has low potential for cropland, woodland, and pasture. The less sloping areas have medium potential for special crops. The potential for residential and other urban use is medium. Chert fragments and slope are limitations that can be overcome by good design.

8. Ruston-Boggy-Saffell

Deep, nearly level to moderately steep, well drained and somewhat poorly drained soils that have a loamy or sandy surface layer and a loamy subsoil or underlying layer; on uplands and flood plains

This map unit is east of the Kiamichi River in the southern part of the county. It makes up about 3 percent of the county. This unit is about 43 percent Ruston soils, 14 percent Boggy soils, 12 percent Saffell soils, and 31 percent soils of minor extent.

Ruston soils are well drained and nearly level to sloping. They are on uplands. They have a loamy or sandy surface layer and a loamy subsoil. Boggy soils are somewhat poorly drained and nearly level. They are on flood plains. They are loamy throughout. Saffell soils are gravelly, well drained, and very gently sloping to moderately steep. They are on uplands and are loamy throughout.

Minor in this unit are Glenpool, Kullit, Smithdale, and other soils.

This unit is used mainly for woodland and pasture. Some tracts are farmed. Low fertility is the main limitation for farming in areas of Ruston soils. Low soil fertility, slope, and gravel are the main limitations for farming in areas of Saffell soils. Flooding and a high water table are the main limitations for farming in areas of Boggy soils.

This unit has medium potential for farming, woodland, and pasture. Most of these soils respond to fertilizer, lime, and good management. The potential for residential and other urban use is high on the uplands. Slope, low strength, and shrink swell are limitations. The potential is low on the flood plains. The flood hazard and the wetness are limitations that are difficult to overcome.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for

each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have a similar profile make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. The Sobol series, for example, was named for the town of Sobol in Pushmataha County.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Sobol clay loam, 3 to 5 percent slopes, is one of several phases within the Sobol series.

Some map units are made up of two or more dominant kinds of soil. Such map units are called soil complexes, soil associations, and undifferentiated groups.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Bernow-Romia complex, 8 to 12 percent slopes, is an example.

A *soil association* is made up of soils that are geographically associated and are shown as one unit on the map because it is not practical to separate them. A soil association has considerable regularity in geographic pattern and in the kinds of soil that are a part of it. The extent of the soils can differ appreciably from one delineation to another; nevertheless, interpretations can be made for use and management of the soils. Honobia-Nashoba association, strongly sloping, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because there is little value in separating them. The pattern and proportion of the soils are not uniform. An area shown on the map has at least one of the dominant (named) soils or may have all of them. Bernow, Bosville, and Romia soils, gullied, is an undifferentiated group in this survey area.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. Rock outcrop is an example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

Not all units in this survey area have been mapped with the same degree of detail. Broadly defined units, identified by a footnote on the soil legend at the back of this publication, are likely to be larger and to vary more in composition than units mapped in greater detail. Composition has been controlled well enough, however, for the expected use of the soils.

The acreage and proportionate extent of each map unit are given in table 4, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

Map unit descriptions

1—Alikchi loam, 1 to 3 percent slopes. This moderately deep, poorly drained, very gently sloping soil on uplands is in narrow valleys of the Ouachita Mountains. Slopes are smooth and mostly concave. Individual areas are 5 to 80 acres.

Typically, the surface layer is dark gray mottled loam 5 inches thick. The subsurface layer is grayish brown mottled loam to a depth of 14 inches. The upper part of the subsoil is dark gray mottled silty clay loam to a depth of 21 inches. The lower part is gray and light gray mottled silty clay loam to 40 inches. The underlying material to 45 inches is dark gray fractured shale that is tilted from horizontal. It is saturated in winter, in spring, and during seasons of high rainfall.

This soil is low in natural fertility. It is medium acid in the surface layer. Permeability is slow. Most plants respond well to fertilizer and lime. The soil has fair tilth and can be worked throughout at a moderate range of moisture conditions. The root zone is restricted by the high water table.

Included in mapping are areas of similar soils that are more than 40 inches thick over shale. The included soils make up less than 10 percent of the unit.

This soil has medium potential for cultivated crops, pasture grasses, and trees. Soil tilth can be best maintained by returning crop residue to the soil and by keeping tillage to a minimum.

This soil has low potential for most urban uses. Wetness is the major limitation.

Capability subclass IVw; woodland suitability group 4w; not assigned to a range site.

2—Alikchi Variant silt loam, 0 to 2 percent slopes. This deep, poorly drained, nearly level to very gently sloping soil is on uplands in valleys of the Ouachita Mountains. Slopes are smooth and mostly concave. Individual areas are 5 to 80 acres.

Typically, the surface layer is dark grayish brown mottled silt loam 6 inches thick. The subsurface layer is light brownish gray silt loam to a depth of 10 inches. The subsoil is light gray silty clay loam to about 55 inches. The underlying material to 60 inches is dark gray fractured shale that is tilted from horizontal. It is saturated with water in winter, in spring, and during seasons of high rainfall.

This soil is low in natural fertility. Most plants respond well to fertilizer and lime. The surface layer is medium acid. Permeability is slow. The soil has fair tilth and can be worked throughout a moderate range of moisture conditions. The root zone is restricted by the high water table.

Included with this soil in mapping are Alikchi soils and similar soils that are more than 60 inches thick over shale bedrock. The included soils make up about 10 percent of the unit.

This soil has medium potential for cultivated crops, pasture grasses, and trees. Soil tilth can be best maintained by returning crop residue to the soil and by avoiding tillage when the soil is wet. The soil has low potential for most urban uses. Wetness is the major limitation.

Capability subclass IIIw; woodland suitability group 3w; not assigned to a range site.

3—Bernow fine sandy loam, 1 to 3 percent slopes. This deep, well drained, very gently sloping soil is on crests of uplands. Slopes are smooth and mostly convex. Individual areas are 5 to 50 acres.

Typically, the surface layer is dark grayish brown fine sandy loam 4 inches thick. The subsurface layer is pale brown fine sandy loam to a depth of 15 inches. The upper part of the subsoil is strong brown sandy clay loam to a depth of 38 inches. The lower part to 80 inches is yellowish red, mottled sandy clay loam that has vertical streaks of light brownish gray sandy loam.

This soil is medium in natural fertility. Typically, the surface layer is medium acid. Most plants respond well to fertilizer and lime. Permeability is moderate. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are some intermingled areas of Kullit, Hamden, and Ruston soils. The included soils make up 15 percent of the unit.

This soil has high potential for cultivated crops and pasture grasses. It has low potential for trees. Tilth is maintained by returning crop residue to the soil and by tilling the soil under the proper moisture conditions. Potential is high for most urban uses. Seepage, low strength, and shrink swell are limitations that can be overcome by good planning and design.

Capability subclass IIe; woodland suitability group 4o; Sandy Savannah range site.

4—Bernow fine sandy loam, 3 to 5 percent slopes. This deep, well drained, gently sloping soil is on side slopes of uplands. Slopes are smooth and mostly convex. Individual areas are 10 to 100 acres.

Typically, the surface layer is pale brown fine sandy loam about 10 inches thick. The upper part of the subsoil is yellowish brown mottled sandy clay loam to a depth of 30 inches. The lower part to a depth of 65 inches is coarsely mottled sandy clay loam that has vertical streaks of light brownish gray fine sandy loam.

This soil is medium in natural fertility. Most plants respond well to fertilizer and lime. Typically, the surface layer is medium acid. Permeability is moderate. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are some intermingled areas of Bosville, Glenpool, Hamden, Larue, and Romia soils. The included soils make up about 15 percent of the unit.

This soil has high potential for cultivated crops and pasture grasses and low potential for trees. Good tilth is maintained by returning crop residue to the soil and by tilling the soil under the proper moisture conditions. Potential is high for most urban uses. Seepage, low strength, and shrink swell are limitations that can be overcome by good planning and design.

Capability subclass IIIe; woodland suitability group 4o; Sandy Savannah range site.

5—Bernow-Romia complex, 8 to 12 percent slopes. This map unit is on uplands. It consists of small areas of deep, well drained, strongly sloping Bernow and Romia soils. The soil areas are so intermingled that they could not be shown separately at the scale selected for mapping. The Bernow soil is on convex side slopes or foot slopes, and the Romia soil is on convex ridge crests or the upper side slopes. Individual areas of the unit are 20 to 400 acres.

The Bernow soil makes up 60 percent of each mapped area. Typically, the surface layer is dark grayish

brown fine sandy loam 3 inches thick. The subsurface layer is brown fine sandy loam to a depth of 10 inches. The upper part of the subsoil is yellowish red sandy clay loam to 30 inches. The middle part is yellowish brown mottled sandy clay loam to a depth of 50 inches. The lower part to a depth of 70 inches is yellowish brown sandy clay loam that has vertical streaks of light gray fine sandy loam.

The Romia soil makes up 25 percent of each mapped area. Typically, the surface layer is dark grayish brown fine sandy loam 4 inches thick. The subsurface layer is pale brown fine sandy loam to a depth of 13 inches. The upper part of the subsoil is red sandy clay loam to 34 inches. The lower part is yellowish red sandy clay loam to 56 inches. The underlying material is soft sandstone to a depth of 60 inches.

Both soils have medium natural fertility. Typically, they are medium acid in the surface layer. Permeability is moderate.

Included with this unit in mapping are some intermingled areas of Bosville and Larue soils. The included soils make up 15 percent of the unit.

The soils in this unit have low potential for cultivated crops and commercial trees and medium potential for pasture grasses. Potential is medium for most urban uses. The slope, seepage, low strength, and shrink swell are limitations that can be overcome by careful planning and good design.

Capability subclass VIe; woodland suitability group 4o; Sandy Savannah range site.

6—Bernow, Bosville, and Romia soils, gullied. This map unit consists of areas of deep, very gently sloping to strongly sloping Bernow, Bosville, and Romia soils. These are well drained and moderately well drained, gullied soils of the Coastal Plains. Slopes range from 1 to 12 percent. The gullies are more than 3 feet deep and occur at intervals of 80 to 250 feet. Most areas of these soils could have been shown separately at the scale selected for mapping but were not because management needs are similar. These soils are on convex side slopes. Individual areas are 10 to 100 acres.

The Bernow soil is well drained. It makes up 60 percent of the unit. Typically, the surface layer is dark grayish brown fine sandy loam 3 inches thick. The subsurface layer is brown fine sandy loam to a depth of 9 inches. The upper part of the subsoil is strong brown sandy clay loam to 30 inches. The lower part to a depth of 72 inches is coarsely mottled sandy clay loam that has vertical streaks of light gray fine sandy loam.

The Bernow soil has medium to low natural fertility. Typically it is medium acid in the surface layer. Permeability is moderate.

The Bosville soil is moderately well drained. It makes up 10 percent of the unit. Typically, the surface layer is brown fine sandy loam 6 inches thick. The subsoil is red mottled clay to a depth of 65 inches.

The Bosville soil has medium to low natural fertility. Typically it is medium acid in the surface layer. Permeability is very slow.

The Romia soil is well drained. It makes up about 15 percent of the unit. Typically, the surface layer is grayish brown fine sandy loam 3 inches thick. The subsurface layer is pale brown fine sandy loam to a depth of 11 inches. The upper part of the subsoil is red sandy clay loam to 35 inches. The lower part is yellowish red sandy clay loam to 45 inches. The underlying material is soft sandstone to a depth of 50 inches.

The Romia soil is medium to low in natural fertility. It is medium acid in the surface layer. Permeability is moderate.

Included with this unit in mapping are some areas of Glenpool, Hamden, and Larue soils. The included soils make up 15 percent of the unit.

The soils in this unit have low potential for cultivated crops, pasture grasses, and trees. They have medium to high potential for most urban uses. The shrink swell and low strength of the Bosville soil are limitations that can be overcome by good planning and design.

Capability subclass VIe; woodland suitability group 5c; Eroded Sandy Savannah range site.

7—Bigfork-Yanush association, steep. This association consists of moderately deep to deep, well drained Bigfork and Yanush soils that occur in a regular and repeating pattern. The Bigfork soil is on rounded to concave side slopes. The Yanush soil is on lower convex to concave side slopes. Slopes range from 20 to 45 percent. Individual areas of each soil are 2 to 20 acres.

The Bigfork soil is moderately deep. It makes up 60 percent of each mapped area. Typically, the surface layer is yellowish brown stony silt loam 5 inches thick. The subsoil is brown stony silty clay loam to a depth of 35 inches. The underlying material to a depth of 40 inches is hard chert tilted 35 degrees from horizontal.

The Bigfork soil has low natural fertility. Typically, it is strongly acid in the surface layer. Permeability is moderate.

The Yanush soil is deep. It makes up 30 percent of each mapped area. Typically, the surface layer is dark brown cherty silt loam 6 inches thick. The subsurface layer is pale brown cherty silt loam to a depth of 12 inches. The upper part of the subsoil is dark reddish brown very cherty silty clay loam to 24 inches. The lower part is yellowish red very cherty silty clay loam to 80 inches.

The Yanush soil is low in natural fertility. Typically, it is medium acid in the surface layer. Permeability is moderate.

Included in mapping are areas of exposed chert bedrock, areas of soils that are similar to the Bigfork soil but are less than 20 inches deep over chert, and areas of Ceda soils on narrow flood plains. The included areas make up about 10 percent of the unit.

The soils in this association have low potential for cultivated crops, trees, and pasture grasses. They have low potential for most urban uses. The depth to rock, slope, and stones are limitations that can be overcome by good planning and design.

Capability subclass VIIs; woodland suitability group 5f; not assigned to a range site.

8—Boggy fine sandy loam. This deep, somewhat poorly drained, nearly level soil is on flood plain of creeks and narrow drainageways in the Coastal Plain. Slopes are mostly smooth and concave. Individual areas are 5 to 200 acres, and many extend the full length of the creek. They are frequently inundated for very brief periods.

Typically, the surface layer is very dark grayish brown fine sandy loam 8 inches thick. The next layer is dark grayish brown mottled fine sandy loam to a depth of 20 inches. The underlying material is dark brown mottled fine sandy loam to 60 inches. It is saturated for short periods in winter and in spring.

This soil is medium in natural fertility. Most pasture grasses respond well to fertilizer and lime. Typically, soil is medium acid in the surface layer. Permeability is moderate.

Included in mapping are small areas of Nahatche variant soils. The included soils make up 15 percent of the unit.

This soil has low potential for cultivated crops and high potential for trees and pasture grasses. It has low potential for most urban uses. Flooding and wetness are limitations.

Capability subclass Vw; woodland suitability group 2w; not assigned to a range site.

9—Bosville fine sandy loam, 3 to 5 percent slopes. This deep, moderately well drained, gently sloping upland soil is on side slopes and crests on the Coastal Plain. Slopes are smooth and mostly convex. Individual areas are 20 to 300 acres.

Typically, the surface layer is brown fine sandy loam 2 inches thick. The subsurface layer is yellowish brown fine sandy loam to a depth of 8 inches. The upper part of the subsoil is red clay to 26 inches. The lower part is red mottled clay to 65 inches.

This soil is medium in natural fertility. Most plants respond well to fertilizer and lime. Typically, the soil is slightly acid in the surface layer. Permeability is very slow. This soil has fair tilth and can be worked throughout a moderate range of moisture conditions. The root zone is slightly restricted by the clay subsoil.

Included in mapping are areas of Bernow, Glenpool, Hamden, Kullit, Larue, Romia, Saffell, and Ruston soils. The included soils make up 15 percent of the unit.

This soil has medium potential for cultivated crops and pasture grasses. It has low potential for trees. Soil tilth is best maintained by returning crop residue to the soil and by avoiding tillage when the soil is wet. This soil has low potential for most urban uses. High shrink swell, low strength, and the very slow permeability are limitations that can be overcome by good planning and design.

Capability subclass IVe; woodland suitability group 4c; Sandy Savannah range site.

10—Bosville fine sandy loam, 5 to 12 percent slopes. This deep, moderately well drained, sloping to strongly sloping upland soil is on side slopes and crests of the Coastal Plain. Slopes are smooth and mostly convex. Individual areas are 20 to 400 acres.

Typically, the surface layer is brown fine sandy loam 2 inches thick. The subsurface layer is brown fine sandy loam to a depth of 6 inches. The upper part of the subsoil is red clay to 24 inches. The middle part is red mottled clay to 45 inches, and the lower part is mottled clay to 65 inches.

This soil is medium in natural fertility. Most pasture grasses respond well to fertilizer and lime. Typically, the soil is slightly acid in the surface layer. Permeability is very slow.

Included in mapping are areas of Bernow, Ruston, Hamden, Larue, Hollywood, and Swink soils. The included soils make up 15 percent of the unit.

This soil has low potential for cultivated crops and trees. It has medium potential for pasture grasses. It has low potential for most urban uses. High shrink swell, low strength, and the very slow permeability are limitations that can be overcome by good design.

Capability subclass VIe; woodland suitability group 4c; Sandy Savannah range site.

11—Carnasaw-Pirum-Clebit association, moderately steep. This map unit consists of large areas of Carnasaw, Pirum, and Clebit soils on uplands. These soils are deep, moderately deep, or shallow and are well drained. They occur in a regular and repeating pattern east of the Kiamichi River in the Ouachita Mountains. The Carnasaw and Pirum soils are on the convex to concave side slopes, and the Clebit soil is on the convex ridges. Slopes are 12 to 20 percent. Individual areas of each soil are 5 to 50 acres.

This unit is in the more moist part of the county. The soils have fewer moisture deficit days in summer than the soils in the Carnasaw-Pirum-Clebit association, dry, moderately steep.

The Carnasaw soil is deep. It makes up 30 percent of each mapped area. Typically, the surface layer is dark grayish brown stony fine sandy loam 2 inches thick. The subsurface layer is pale brown stony fine sandy loam to a depth of 7 inches. The subsoil is red clay to 41 inches. The underlying material to 60 inches is fractured shale that has laminated thin layers of soft sandstone and is tilted 60 degrees from horizontal.

The Carnasaw soil has low natural fertility. Typically, it is strongly acid in the surface layer. Permeability is slow.

The Pirum soil is moderately deep. It makes up 29 percent of each mapped area. Typically, the surface layer is dark grayish brown stony fine sandy loam 5 inches thick. The subsurface layer is yellowish brown stony fine sandy loam to a depth of 10 inches. The subsoil is strong brown sandy clay loam to 35 inches. The underlying material to 38 inches is fractured hard sandstone bedrock that is tilted 60 degrees from horizontal.

The Pirum soil is low in natural fertility. Typically, it is strongly acid in the surface layer. Permeability is moderate.

The Clebit soil is shallow. It makes up 18 percent of each mapped area. Typically, the surface layer is very dark grayish brown stony very fine sandy loam to a depth of 12 inches. The underlying material to 16 inches is hard sandstone that is tilted 40 degrees from horizontal.

The Clebit soil is low in natural fertility. Typically, it is medium acid in the surface layer. Permeability is moderately rapid.

Included with this unit in mapping are areas of soils that are similar to the Carnasaw soil but are more than 60 inches deep over shale; areas of soils that are similar to the Pirum soil but are more than 40 inches deep over sandstone; and areas of Rock outcrop. The included soils and Rock outcrop make up 23 percent of the unit.

The soils in this association have low potential for cultivated crops. The Carnasaw and Pirum soils have medium potential for trees, and the Clebit soil has low potential for trees. All have low potential for most urban uses. The slope, stones, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass VIIs; Carnasaw and Pirum soils in woodland suitability group 3x, Clebit soil in group 5x; not assigned to a range site.

12—Carnasaw-Pirum-Clebit association, dry, moderately steep. This map unit consists of large areas of Carnasaw, Pirum, and Clebit soils on uplands. These soils are deep, moderately deep, or shallow and are well drained. They occur in a regular and repeating pattern west of the Kiamichi River in the Ouachita Mountains. The Carnasaw and Pirum soils are on the convex to concave side slopes, and Clebit soil is on the convex ridges. Slopes are 12 to 20 percent. Individual areas of the unit are 100 to several hundred acres. Individual areas of each soil are 5 to 50 acres in size.

This unit is in the drier part of the county. The soils have more moisture deficit days in summer than the soils in the Carnasaw-Pirum-Clebit association, moderately steep.

The Carnasaw soil is deep. It makes up 30 percent of each mapped area. Typically, the surface layer is very dark grayish brown stony fine sandy loam 3 inches thick. The subsurface layer is brown stony fine sandy loam to a depth of 7 inches. The subsoil is red clay to 42 inches. It is mottled in the lower part. The underlying material to 46 inches is gray shale that is tilted 40 degrees from horizontal.

The Carnasaw soil is low in natural fertility. Typically, it is strongly acid in the surface layer. Permeability is slow.

The Pirum soil is moderately deep. It makes up 30 percent of each mapped area. Typically, the surface layer is dark grayish brown stony fine sandy loam 4 inches thick. The subsurface layer is yellowish brown stony fine sandy loam to a depth of 10 inches. The subsoil is reddish brown mottled sandy clay loam to 34 inches. The underlying material to 40 inches is hard fractured sandstone that is tilted 40 degrees from horizontal.

The Pirum soil is low in natural fertility. Typically, it is strongly acid in the surface layer. Permeability is moderate.

The Clebit soil is shallow. It makes up 15 percent of each mapped area. Typically, the surface layer is very dark grayish brown stony very fine sandy loam 5 inches thick. The subsoil is brown stony very fine sandy loam to a depth of 12 inches. The underlying material to 15 inches is hard sandstone that is tilted 40 degrees from horizontal.

The Clebit soil is low in natural fertility. Typically, it is medium acid in the surface layer. Permeability is moderately rapid.

Included with this unit in mapping are areas of soils that are similar to the Carnasaw soil but are more than 60 inches deep over shale; areas of soils that are similar to the Pirum soil but are more than 40 inches deep over sandstone; and areas of Rock outcrop. The included soils and Rock outcrop make up 25 percent of the unit.

The soils in this association have low potential for cultivated crops, pasture grasses, and trees. They have low potential for most urban uses. The slope, stones, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass VIIs; Carnasaw and Pirum soils in woodland suitability group 4x, Sandy Savannah range site; Clebit soil in woodland suitability group 5x, Shallow Savannah range site.

13—Carnasaw-Stapp association, strongly sloping. This map unit consists of large areas of Carnasaw and Stapp soils on uplands. These soils are deep and well drained or moderately well drained. Slopes are 8 to 12 percent. The soils occur in a regular and repeating pattern east of the Kiamichi River. They are on smooth convex to concave mountaintops. The Carnasaw soil is in the convex areas, and the Stapp soil is in the concave areas. Individual areas of the map unit are 150 to several hundred acres. Individual areas of each soil are 5 to 50 acres.

This unit is in the more moist part of the county. The soils have fewer moisture deficit days in summer than

the soils in Carnasaw-Stapp association, dry, strongly sloping.

The Carnasaw soil is well drained. It makes up 43 percent of each mapped area. Typically, the surface layer is grayish brown stony fine sandy loam 3 inches thick. The subsurface layer is pale brown stony fine sandy loam to a depth of 7 inches. The subsoil is red clay to 45 inches. The underlying material to 50 inches is gray fractured shale that is tilted 20 degrees from horizontal.

The Stapp soil is moderately well drained. It makes up 35 percent of each mapped area. Typically, the surface layer is dark grayish brown stony fine sandy loam 2 inches thick. The subsurface layer is brown stony fine sandy loam to a depth of 8 inches. The upper part of the subsoil to 36 inches is red clay that is mottled in the lower part. The lower part of the subsoil is mottled clay to 44 inches. The underlying material to 50 inches is gray shale that is tilted 20 degrees from horizontal.

Both soils are low in natural fertility. Typically, they are strongly acid in the surface layer. Permeability is slow.

Included with this unit in mapping are areas of Clebit, Sobol, and Tuskahoma soils; areas of soils that are similar to the Stapp soil but have a loamy subsoil; and areas of soils that are similar to Carnasaw and Stapp soils but are deeper over shale. The included soils make up 22 percent of the map unit.

The soils in this association have low potential for cultivated crops. They have medium potential for trees. They have low to medium potential for most urban uses. The stones, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass VIIs; woodland suitability group 3x; not assigned to a range site.

14—Carnasaw-Stapp association, dry, strongly sloping. This map unit consists of large areas of Carnasaw and Stapp soils on uplands. These soils are deep and well drained or moderately well drained. Slopes are 8 to 12 percent. The soils occur in a regular and repeating pattern east of the Kiamichi River. They are on smooth convex to concave mountaintops. The Carnasaw soil is in the convex areas, and the Stapp soil is in the concave areas. Individual areas of the map unit are 150 to several hundred acres. Individual areas of each soil are 5 to 50 acres.

This unit is in the drier part of the county. The soils have more moisture deficit days in summer than the soils in Carnasaw-Stapp association, strongly sloping.

The Carnasaw soil is well drained. It makes up 40 percent of each mapped area. Typically, the surface layer is very dark grayish brown stony fine sandy loam 3 inches thick. The subsurface layer is brown stony fine sandy loam to a depth of 8 inches. The subsoil is red clay to 44 inches. The underlying material to 48 inches is gray shale that is tilted 20 degrees from horizontal.

The Stapp soil is moderately well drained. It makes up 30 percent of each mapped area. Typically, the surface layer is dark grayish brown stony fine sandy loam 2 inches thick. The subsurface layer is brown stony fine sandy loam to a depth of 7 inches. The subsoil is red mottled clay to 45 inches. The underlying material to 46 inches is gray shale that is tilted 20 degrees from horizontal.

Both soils are low in natural fertility. Typically, they are strongly acid in the surface layer. Permeability is slow.

Included with this unit in mapping are areas of Clebit, Sobol, and Tuskahoma soils; areas of soils that are similar to the Stapp soil but have a loamy subsoil; and areas of soils that are similar to Carnasaw and Stapp soils but are thicker over the parent material. The included areas make up 30 percent of the map unit.

The soils in this association have low potential for cultivated crops and trees. They have low to medium potential for most urban uses. The stones, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass VIIs; woodland suitability group 4x; Sandy Savannah range site.

15—Ceda cherty silt loam, occasionally flooded. This deep, well drained, nearly level to very gently sloping soil is on narrow flood plains in the Ouachita Mountains. Slopes are 0 to 2 percent. Individual areas are 50 to 500 acres. The soil is occasionally inundated for very brief periods.

Typically, the surface layer is dark brown cherty silt loam 11 inches thick. The next layer is brown cherty silt loam to a depth of 20 inches. The underlying material is yellowish brown and brown very cherty silt loam to a depth of 50 inches.

This soil is low in natural fertility. Typically, it is neutral in the surface layer. Permeability is rapid.

Included with this soil in mapping are small areas of similar soils that have less chert and areas of Rubble land. The included soils and Rubble land make up less than 10 percent of the unit.

This soil has low potential for cultivated crops and medium potential for pasture grasses and trees. It has low potential for most urban uses. Flooding is the major limitation.

Capability subclass VIs; woodland suitability group 3f; not assigned to a range site.

16—Ceda cherty silt loam, frequently flooded. This deep, well drained, nearly level to very gently sloping soil is on narrow flood plains in the Ouachita Mountains. Slopes are 0 to 2 percent. Individual areas are 50 to 500 acres. The soil is frequently inundated for very brief periods.

Typically, the surface layer is very dark brown cherty silt loam 11 inches thick. The next layer is brown cherty

silt loam to a depth of 24 inches. The underlying material is brown cherty silt loam to a depth of 60 inches.

This soil is low in natural fertility. Typically, it is slightly acid in the surface layer. Permeability is rapid.

Included with this soil in mapping are small areas of similar soils that are lighter in color, similar soils that contain less chert, and Rubble land. The included soils and Rubble land make up 10 percent of the unit.

This soil has low potential for cultivated crops and medium potential for pasture grasses and trees. It has low potential for most urban uses. Flooding is the major limitation.

Capability subclass VIIs; woodland suitability group 3f; not assigned to a range site.

17—Ceda-Rubble land complex. This complex consists of deep, well drained, nearly level to very gently sloping Ceda soils and Rubble land. The areas of soil and Rubble land are so intermingled that they could not be shown separately at the scale selected for mapping. Slopes are 0 to 3 percent. The soil and Rubble land are on narrow flood plains in the Ouachita Mountains. The Ceda soil is on the back side of the flood plain, and the Rubble land is in stream channels and in narrow areas close to the stream channels. Individual areas are 50 to 2,000 acres. This unit is frequently inundated for very brief periods.

The Ceda soil makes up 75 percent of each mapped area. Typically, the surface layer is dark grayish brown gravelly fine sandy loam 12 inches thick. The underlying material is yellowish brown gravelly fine sandy loam to a depth of 65 inches.

The Ceda soil has low natural fertility. Typically, it is slightly acid in the surface layer. Permeability is rapid.

Rubble land makes up 15 percent of each mapped area. It consists of boulders, cobblestones and other stones, and gravel. A few thin layers of loamy material make up less than 10 percent of the Rubble land, by volume.

Rubble land is very low in natural fertility.

Included with this unit in mapping are some intermingled areas of soils that are similar to the Ceda soil but have a gravelly sandy clay loam subsoil. The included soils make up about 10 percent of the unit.

The soils in this unit have low potential for cultivated crops and medium potential for pasture grasses and trees. They have low potential for most urban uses. Flooding is the major limitation.

Capability subclass VIIs; woodland suitability group 3f; not assigned to a range site.

18—Clebit-Pirum-Carnasaw association, steep. This map unit consists of large areas of Clebit, Pirum, and Carnasaw soils on uplands. These soils are shallow, moderately deep, or deep and are well drained. They occur in a regular and repeating pattern east of the Kiamichi River in the Ouachita Mountains. The Clebit soil is on the convex ridges. The Pirum and Carnasaw soils are on the convex to concave side slopes. Slopes range from 20 to 45 percent. Individual areas of the unit are mostly several hundred acres. Individual areas of each soil are 5 to 50 acres.

This unit occurs in the more moist part of the county. The soils have fewer moisture deficit days in summer than the soil in the Clebit-Pirum-Carnasaw association, dry, steep.

The Clebit soil is shallow. It makes up 35 percent of each mapped area. Typically, the surface layer is very dark grayish brown stony fine sandy loam 4 inches thick. The subsoil is brown stony very fine sandy loam to a depth of 11 inches. The underlying material to 14 inches is hard fractured sandstone that is tilted 70 degrees from horizontal.

The Clebit soil is low in natural fertility. Typically, it is medium acid in the surface layer. Permeability is moderately rapid.

The Pirum soil is moderately deep. It makes up 27 percent of each mapped area. Typically, the surface layer is dark grayish brown stony fine sandy loam 4 inches thick. The subsurface layer is yellowish brown stony fine sandy loam to a depth of 10 inches. The subsoil is strong brown sandy clay loam to 32 inches. The underlying material to 36 inches is hard fractured sandstone that is tilted 70 degrees from horizontal.

The Pirum soil is low in natural fertility. It is strongly acid in the surface layer. Permeability is moderate.

The Carnasaw soil is deep. It makes up 25 percent of each mapped area. Typically, the surface layer is dark grayish brown stony fine sandy loam 2 inches thick. The subsurface layer is pale brown stony fine sandy loam to a depth of 7 inches. The subsoil is red clay to a depth of 40 inches. The underlying material to 50 inches is gray fractured shale that is tilted 70 degrees from horizontal.

The Carnasaw soil is low in natural fertility. Typically, it is strongly acid in the surface layer. Permeability is slow.

Included with this unit in mapping are areas of soils that are similar to the Carnasaw soil but are more than 60 inches deep over shale; areas of soils that are similar to the Pirum soil but are more than 40 inches deep over sandstone; and areas of Rock outcrop. The included soils and Rock outcrop make up 13 percent of the map unit.

The soils of this association have low potential for cultivated crops. The Pirum and Carnasaw soils have medium potential for trees, and the Clebit soil has low potential for trees. All have low potential for urban uses. The slope, stones, depth to rock, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass VIIs; not assigned to a range site; Clebit soil in woodland suitability group 5x, Pirum and Carnasaw soils in group 3x.

19—Clebit-Pirum-Carnasaw association, dry, steep. This association consists of large areas of Clebit, Pirum, and Carnasaw soils on uplands. These soils are shallow, moderately deep, or deep and are well drained. They occur in a regular and repeating pattern west of the Kiamichi River in the Ouachita Mountains. The Clebit soil is on the convex ridges. The Pirum and Carnasaw soils are on the convex to concave side slopes. Slopes range from 20 to 45 percent. Individual areas of the unit are mostly several hundred acres. Individual areas of each soil are 5 to 50 acres.

This unit occurs in the drier part of the county. The soils have more moisture deficit days in summer than the soil in the Clebit-Pirum-Carnasaw association, steep.

The Clebit soil is shallow. It makes up 30 percent of each mapped area. Typically, the surface layer is very dark grayish brown stony fine sandy loam 4 inches thick. The subsoil is brown stony fine sandy loam to a depth of 13 inches. The underlying material to 15 inches is hard fractured sandstone that is tilted 60 degrees from horizontal.

The Clebit soil is low in natural fertility. Typically, it is medium acid in the surface layer. Permeability is moderately rapid.

The Pirum soil is moderately deep. It makes up 25 percent of each mapped area. Typically, the surface layer is brown stony fine sandy loam 5 inches thick. The subsurface layer is pale brown stony fine sandy loam to a depth of 10 inches. The subsoil is reddish brown sandy clay loam to 39 inches. The underlying material to 50 inches is hard sandstone that is tilted 60 degrees from horizontal.

The Carnasaw soil is low in natural fertility. Typically, it is strongly acid in the surface layer. Permeability is moderate.

Included with this unit in mapping are areas of soils that are similar to the Carnasaw soil but have a mottled subsoil or are more than 60 inches deep over shale; areas of soils that are similar to the Pirum soil but are more than 40 inches deep over sandstone; and areas of Rock outcrop. The included soils and Rock outcrop make up 20 percent of the map unit.

The soils of this association have low potential for cultivated crops and trees.

They have low potential for most urban uses. The slope, stones, depth to rock, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass VIIs; Savannah Breaks range site; Clebit soil in woodland suitability group 5x, Pirum and Carnasaw soils in group 4x.

20—Clebit-Rock outcrop association, steep. This association consists of large areas of shallow, well drained Clebit soils and Rock outcrop. The soils and Rock outcrop occur in a regular and repeating pattern in the Ouachita Mountains. The Clebit soil is on convex ridges, and the Rock outcrop is on the side slopes of the escarpments. Slopes range from 20 to 45 percent. Individual areas of the unit are mostly several hundred acres.

The Clebit soil makes up 50 percent of each mapped area. Typically, the surface layer is very dark grayish brown stony fine sandy loam 4 inches thick. The subsoil is brown stony fine sandy loam to a depth of 12 inches. The underlying material to 15 inches is hard fractured sandstone that is tilted 60 degrees from horizontal.

The Clebit soil is low in natural fertility. Typically, it is medium acid in the surface layer. Permeability is moderately rapid.

The Rock outcrop makes up 15 percent of each mapped area. Typically, it consists of massive sandstone exposed at the surface or several feet above the surface. Quartzitic sandstone makes up a minor percentage of the exposed bedrock.

Rock outcrop is barren.

Included with this unit in mapping are areas of Carnasaw, Stapp, and Pirum soils. The included soils make up 35 percent of the unit.

This association has low potential for cultivated crops, pasture grasses, or trees. It has low potential for most urban uses. The slopes, stones, Rock outcrop, and depth to rock are limitations.

Capability subclass VIIs; woodland suitability group 5x; Clebit soil in Savannah Breaks range site, Rock outcrop not assigned to a range site.

21—Dela fine sandy loam, occasionally flooded. This deep, moderately well drained, nearly level to very gently sloping soil is on flood plains of rivers and creeks. Slopes are 0 to 2 percent. Individual areas are 30 to 200 acres. The soil is occasionally inundated for very brief periods.

Typically, the surface layer is dark grayish brown fine sandy loam 6 inches thick. The next layer is brown fine sandy loam to a depth of 12 inches. The upper part of the underlying material is stratified yellowish brown and light yellowish brown fine sandy loam to a depth of 36 inches. The lower part of the underlying material is stratified pale brown and very pale brown loamy fine sand to 72 inches.

This soil is medium in natural fertility. Typically, it is slightly acid in the surface layer. Permeability is moderately rapid. The soil has good tilth and can be worked throughout a moderate range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are small areas of Guyton and Rexor soils. The included soils make up less than 10 percent of the unit.

This soil has high potential for cultivated crops, pasture grasses, and trees. Tilth can be maintained by returning crop residue to the soil and by tilling only under the proper moisture conditions. The soil has low potential for most urban uses. Flooding is the major limitation.

Capability subclass IIw; woodland suitability group 2o; not assigned to a range site.

22—Dela fine sandy loam, frequently flooded. This deep, moderately well drained, nearly level to very gently sloping soil in on flood plains of rivers and creeks. Slopes are 0 to 2 percent. Individual areas are 50 to 2,000 acres. The soil is frequently inundated for very brief periods.

Typically, the surface layer is dark grayish brown fine sandy loam 6 inches thick. The next layer is brown fine sandy loam to a depth of 10 inches. The upper part of the underlying material is stratified yellowish brown and light yellowish brown fine sandy loam to 36 inches. The lower part of the underlying material is stratified pale brown loamy fine sand and very pale brown loamy sand to a depth of 80 inches.

This soil is medium in natural fertility. Typically, it is slightly acid in the surface layer. Permeability is moderately rapid.

Included with this soil in mapping are small areas of Ceda soils and Rubble land. The included soils and Rubble land make up 15 percent of the unit.

This soil has low potential for cultivated crops and high potential for pasture grasses and trees. It has low potential for most urban uses. Flooding is the major limitation.

Capability subclass Vw; woodland suitability group 2o; not assigned to a range site.

23—Glenpool loamy fine sand, 0 to 3 percent slopes. This deep, somewhat excessively drained, nearly level to very gently sloping soil is on uplands of the Coastal Plain. Slopes are convex to concave. Individual areas are 30 to 200 acres.

Typically, the surface layer is brown loamy fine sand 11 inches thick. The subsurface layer is brown loamy fine sand to a depth of 46 inches. The upper part of the subsoil is strong brown loamy fine sand to a depth of 60 inches. The lower part to 80 inches is yellowish red loamy fine sand that has thin alternating layers of red fine sandy loam.

This soil is low in natural fertility. Typically, it is medium acid in the surface layer. Permeability is rapid. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are small areas of similar soils that are less than 40 inches thick over the subsoil. The included soils make up 15 percent of the unit.

This soil has low potential for cultivated crops and trees. It has medium potential for pasture grasses. Under irrigation, potential for tree nurseries is high. Soil tilth can be maintained by returning crop residue to the soil and by tilling only under optimum moisture conditions. Erosion is a hazard if crops are grown. Planting pasture grasses is the best way to control erosion. The soil has high potential for most urban uses. Seepage and the sandy surface texture are limitations that can be overcome by good planning and design.

Capability subclass IVs; woodland suitability group 4s; Deep Sand Savannah range site.

24—Glenpool loamy fine sand, 3 to 12 percent slopes. This deep, somewhat excessively drained, gently sloping to strongly sloping soil is on uplands of the Coastal Plain. Individual areas are 30 to 300 acres.

Typically, the surface layer is brown loamy fine sand 9 inches thick. The subsurface layer is brown loamy fine sand to a depth of 46 inches. The upper part of the subsoil is yellowish red loamy fine sand to a depth of 60 inches. The lower part to 80 inches is yellowish red loamy fine sand that has thin alternating layers of red fine sandy loam.

This soil is low in natural fertility. Typically, it is medium acid in the surface layer. Permeability is rapid. The root zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are small areas of similar soils that are less than 40 inches thick over the subsoil. The included soils make up 15 percent of the unit.

This soil has low potential for cultivated crops, pasture grasses, and trees. It has medium potential for most urban uses. Seepage, slope, and sandy surface texture are limitations that can be overcome by good planning and design.

Capability subclass VIe; woodland suitability group 4s; Deep Sand Savannah range site.

25—Guyton silt loam. This deep, poorly drained nearly level soil is on stream terraces along the rivers and creeks. Slopes are concave. Individual areas are 40 to 200 acres. The soil is subject to occasional overflow. It is inundated for very brief periods. It is saturated in winter and in spring.

Typically, the surface layer is brown silt loam 6 inches thick. The subsurface layer is light brownish gray silt loam to a depth of 12 inches. The upper part of the subsoil, to a depth of 25 inches, is grayish brown silty clay loam that has tongues of light brownish gray silt loam. The lower part is gray mottled silty clay loam to a depth of 66 inches.

This soil is medium in natural fertility. Typically, the surface layer is medium acid. Permeability is very slow. The soil has poor tilth and can be worked throughout only a narrow range of moisture conditions. The root zone is deep, but plant roots penetrate it with difficulty.

Included with this soil in mapping are small areas of Dela and Rexor soils. The included soils make up less than 15 percent of the unit.

This soil has medium potential for cultivated crops and pasture grasses and high potential for trees. Soil tilth can

be improved by returning crop residue to the soil, keeping tillage to a minimum, including grasses and legumes in the cropping system, and draining the soil artificially. The soil has low potential for most urban uses. Wetness, slow permeability, and flooding are limitations.

Capability subclass IVw; woodland suitability group 2w; not assigned to a range site.

26—Guyton-Elysian complex, undulating. This map unit consists of small areas of deep, poorly drained and moderately well drained, nearly level to gently sloping Guyton and Elysian soils on terraces. The soil areas are so intermingled that they could not be shown separately at the scale selected for mapping. Guyton soils are between mounds and Elysian soils are on mounds. Slopes are 0 to 3 percent. Individual areas of the complex are 5 to 100 acres. The soils are inundated occasionally for very brief periods.

The Guyton soil is poorly drained. It is saturated in winter and in spring. It makes up 75 percent of each mapped area. Typically, the surface layer is grayish brown mottled silt loam 3 inches thick. The subsurface layer is light brownish gray mottled silt loam to a depth of 6 inches. The upper part of the subsoil, to a depth of 16 inches, is gray mottled silty clay loam that has tongues of light gray silt loam. The lower part is gray mottled silty clay loam to 70 inches. Mottles are in shades of brown and gray throughout.

The Guyton soil has medium natural fertility. Typically, the surface layer is strongly acid. Permeability is very slow.

The Elysian soil is moderately well drained. It makes up 15 percent of each mapped area. Typically, the surface layer is yellowish brown very fine sandy loam 7 inches thick. The next layer is yellowish brown very fine sandy loam to a depth of 15 inches. The upper part of the subsoil, to 40 inches, is dark brown mottled loam that has tongues and streaks of very pale brown very fine sandy loam. The lower part is gray mottled silty clay loam to 60 inches.

The Elysian soil is medium in natural fertility. Typically, it is medium acid in the surface layer. Permeability is moderate.

Included with this unit in mapping are some intermingled areas of Wrightsville soils. The included soils make up 10 percent of the unit.

The soils in this complex have medium potential for cultivated crops and pasture grasses and high potential for trees. The soil in the intermound areas has poor tilth and can be worked throughout only a narrow range of moisture conditions. The root zone is deep, but plant roots penetrate it with difficulty. Soil tilth can be improved by returning crop residue to the soil, keeping tillage to a minimum, and draining the soil artificially.

These soils have low potential for most urban uses. Wetness, flooding, and the slow permeability of the Guyton soil are limitations.

Capability subclass IIIw; not assigned to a range site; Guyton soil in woodland suitability group 2w, Elysian soil in group 2o.

27—Hamden fine sandy loam, 0 to 2 percent slopes. This deep, moderately well drained, nearly level to very gently sloping soil is on uplands of the Coastal Plain. Individual areas are 5 to 150 acres.

Typically, the surface layer is grayish brown fine sandy loam 5 inches thick. The upper part of the subsoil is brown and yellowish brown mottled sandy clay loam to a depth of 30 inches. The lower part is light gray mottled sandy clay to 72 inches.

This soil is medium in natural fertility. The surface layer is strongly acid. Permeability is moderately slow. The soil has fair tilth and can be worked throughout a moderate range of moisture conditions. The root zone is deep.

Included with this soil in mapping are areas of similar soils that have mottles throughout the subsoil because of wetness and areas of similar soils that have less clay in the lower part of the subsoil. The included soils make up 20 percent of the unit.

This soil has high potential for cultivated crops and pasture grasses and medium potential for trees. Tilth can be maintained by returning adequate amounts of crop residue to the soil, by tilling only under the proper moisture conditions, and by keeping tillage to a minimum. The soil has low potential for most urban uses. Wetness, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass IIw; woodland suitability group 3w; Sandy Savannah range site.

28—Hollywood-Swink complex, 2 to 8 percent slopes. This map unit consists of small areas of deep and shallow, moderately well drained and well drained, very gently sloping to sloping Hollywood and Swink soils on uplands. The soil areas are so intermingled that they could not be shown separately at the scale selected for mapping. The Hollywood soil is on convex side slopes, and the Swink soil is on convex ridges. Individual areas of the unit are 5 to 100 acres.

The Hollywood soil is deep and moderately well drained. It makes up 60 percent of each mapped area. Typically, the surface layer is very dark gray clay loam 18 inches thick. The next layer is very dark gray clay to a depth of 24 inches. The upper part of the subsoil is olive brown clay to 30 inches. The lower part is light olive brown mottled clay to 60 inches.

The Hollywood soil has high natural fertility. Typically, the surface layer is moderately alkaline. Permeability is very slow.

The Swink soil is shallow and well drained. It makes up 40 percent of each mapped area. Typically, the surface layer is very dark gray stony clay 10 inches thick. The next layer is very dark grayish brown stony clay to a

depth of 15 inches. The underlying material is hard fractured limestone to 20 inches.

The Swink soil is high in natural fertility. Typically, the surface layer is moderately alkaline. Permeability is slow.

Included with this unit in mapping are intermingled areas of similar soils that are 20 to 60 inches deep over bedrock. The included soils are minor in extent.

The soils in this map unit have low potential for cultivated crops and trees and medium potential for pasture grasses. They have low potential for most urban uses. High shrink swell, low strength, and depth to rock are limitations that can be overcome by good planning and design.

Capability subclass VIe; not assigned to a woodland suitability group; Hollywood soil in Black Clay Prairie range site, Swink soil in Shallow Prairie range site.

29—Honobia-Nashoba association, strongly sloping. This map unit consists of large areas of moderately deep, well drained Honobia and Nashoba soils on uplands. Slopes are 8 to 12 percent. These soils are in long narrow valleys of the Ouachita Mountains. The position of each on the landscape is variable. Individual areas of the unit are generally several hundred acres.

The Honobia soil makes up 60 percent of each mapped area. Typically, the surface layer is dark grayish brown stony fine sandy loam 4 inches thick. The subsurface layer is strong brown stony fine sandy loam to a depth of 8 inches. The upper part of the subsoil, to a depth of 16 inches, is yellowish red clay loam mixed with flat fragments of shale and sandstone. The lower part to 36 inches is yellowish red mottled clay mixed with flat fragments of sandstone and shale. The underlying material to 40 inches is olive shale that is tilted 40 degrees from horizontal.

The Honobia soil is low in natural fertility. Typically, it is slightly acid in the surface layer. Permeability is slow.

The Nashoba soil makes up 18 percent of each mapped area. Typically, the surface layer is grayish brown stony sandy loam 4 inches thick. The subsoil is brown stony sandy loam to a depth of 30 inches. The underlying material grades through to a mixture of 90 percent sandstone and 10 percent soil, and at 40 inches it is 100 percent hard sandstone that is tilted 40 degrees from horizontal.

The Nashoba soil is low in natural fertility. Typically, it is medium acid in the surface layer. Permeability is moderately rapid.

Included with this unit in mapping are areas of Clebit, Sobol, and Tuskahoma soils and Rock outcrop. The included soils and Rock outcrop make up 22 percent of the unit.

The soils of this association have low potential for cultivated crops, pasture grasses, or trees. They have low potential for most urban uses. The stones are the major limitation that must be overcome by planning and design.

Capability subclass VIIs; woodland suitability group 4x; not assigned to a range site.

30—Kullit fine sandy loam, 0 to 2 percent slopes. This deep, moderately well drained, nearly level to very gently sloping soil is on uplands of the Coastal Plain. Individual areas are 5 to 150 acres.

Typically, the surface layer is grayish brown fine sandy loam 5 inches thick. The subsurface layer is brown fine sandy loam to a depth of 16 inches. The upper part of the subsoil is yellowish brown mottled sandy clay loam to 30 inches. The middle part is yellowish red mottled sandy clay loam to 48 inches. The lower part is light gray mottled clay to a depth of 72 inches.

This soil is low in natural fertility. Typically, it has a strongly acid surface layer. Permeability is moderately slow. The soil has fair tilth and can be worked throughout a moderate range of moisture conditions. The root zone is deep.

Included with this soil in mapping are areas of similar soils that have mottles throughout the subsoil because of wetness and similar soils that have less clay in the lower part of the subsoil. The included soils make up 20 percent of the unit.

This soil has high potential for cultivated crops, pasture grasses, and trees. Tilth can be maintained by returning adequate amounts of crop residue to the soil, by tilling only under the proper moisture conditions, and by keeping tillage to a minimum. The soil has low potential for most urban uses. Wetness is the major limitation that must be overcome by planning and design.

Capability subclass IIw; woodland suitability group 2w; not assigned to a range site.

31—Larue loamy fine sand, 0 to 3 percent slopes. This deep, well drained, nearly level to very gently sloping soil is on uplands of the Coastal Plain. Individual areas are 5 to 30 acres.

Typically, the surface layer is brown loamy fine sand 6 inches thick. The subsurface layer is pale brown loamy fine sand to a depth of 28 inches. The upper part of the subsoil is strong brown sandy clay loam to a depth of 40 inches. The lower part to 72 inches is yellowish red sandy clay loam that has vertical streaks of light brownish gray sandy loam.

This soil is low in natural fertility. Typically, the surface layer is medium acid. Permeability is moderate. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are small areas of Bosville and Saffell soils. The included soils make up 10 percent of the unit.

This soil has medium potential for cultivated crops and pasture grasses and low potential for trees. If irrigated, it has high potential for tree nurseries. Soil tilth can be maintained by returning crop residue to the soil. Erosion

is a hazard if crops are grown. The soil has high potential for most urban uses. The sandy texture is the major limitation that must be overcome by planning and design.

Capability subclass IIIe; woodland suitability group 4s; Deep Sand Savannah range site.

32—Larue loamy fine sand, 3 to 8 percent slopes. This deep, well drained, gently sloping to sloping soil is on uplands of the Coastal Plain. Individual areas are 30 to 300 acres.

Typically, the surface layer is dark grayish brown loamy fine sand 4 inches thick. The subsurface layer is pale brown loamy fine sand to a depth of 30 inches. The upper part of the subsoil is yellowish red sandy clay loam to a depth of 50 inches. The lower part to 72 inches is yellowish red sandy clay loam that has vertical streaks of light brownish gray sandy loam.

This soil is low in natural fertility. Typically, the surface layer is medium acid. Permeability is moderate. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are small areas of Bosville and Saffell soils. The included soils make up 10 percent of the unit.

This soil has low potential for cultivated crops and trees and medium potential for pasture grasses. Tilth can be maintained by returning residue to the soil. Erosion is a problem if crops are grown. The soil has high potential for most urban uses. The slope and sandy texture are limitations that can be overcome by planning and design.

Capability subclass IVe; woodland suitability group 4s; Deep Sand Savannah range site.

33—Moyers-Burwell complex, 1 to 3 percent slopes. This complex consists of small areas of deep, moderately well drained, very gently sloping Moyers and Burwell soils on uplands. The soil areas are so intermingled that they could not be shown separately at the scale selected for mapping. The Moyers soil is between mounds, and the Burwell soil is on mounds. Individual areas of the complex are 5 to 40 acres.

The Moyers soil makes up 80 percent of each mapped area. Typically, the surface layer is very dark grayish brown loam 8 inches thick. The next layer is brown loam to a depth of 16 inches. The upper part of the subsoil is yellowish brown clay loam to a depth of 26 inches. The lower part is light yellowish brown mottled clay to 55 inches. The underlying material is slightly weathered olive shale to a depth of 72 inches.

The Moyers soil has medium natural fertility. Typically, the surface layer is slightly acid. Permeability is slow.

The Burwell soil makes up 15 percent of each mapped area. Typically, the surface layer is very dark grayish brown loam 25 inches thick. The subsurface layer is brown mottled loam to a depth of 32 inches. The upper part of the subsoil is yellowish brown mottled clay loam to 55 inches. The lower part is mottled clay loam to a depth of 72 inches.

The Burwell soil has high natural fertility. Typically, the surface layer is medium acid. Permeability is slow.

Included with this unit in mapping are some intermingled areas of Alikchi and Wister soils. The included soils make up 5 percent of the unit.

The soils in this map unit have high potential for cultivated crops and pasture grasses and low potential for trees. They have fair tilth and can be worked throughout a moderate range of moisture conditions. The root zone is deep. Soil tilth can be improved by returning crop residue to the soil and by keeping tillage to a minimum. These soils have low potential for most urban uses. Wetness, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass IIe; not assigned to a woodland suitability group; Loamy Prairie range site.

34—Moyers-Burwell complex, 3 to 5 percent slopes. This complex consists of small areas of deep, moderately well drained, gently sloping Moyers and Burwell soils on uplands. The soil areas are so intermingled that they could not be shown separately at the scale selected for mapping. The Moyers soil is between mounds, and the Burwell soil is on mounds. Individual areas of the complex are 5 to 60 acres.

The Moyers soil makes up 70 percent of each mapped area. Typically, the surface layer is very dark grayish brown loam 9 inches thick. The next layer is brown loam to a depth of 15 inches. The upper part of the subsoil is yellowish brown mottled clay loam to a depth of 24 inches. The lower part is light yellowish brown mottled clay to 44 inches. The underlying material is slightly weathered olive shale to a depth of 50 inches.

The Moyers soil has medium natural fertility. Typically, the surface layer is slightly acid. Permeability is slow.

The Burwell soil makes up 20 percent of each mapped area. Typically, the surface layer is very dark grayish brown loam 23 inches thick. The subsurface layer is brown mottled loam to a depth of 28 inches. The upper part of the subsoil is yellowish brown mottled clay loam to 48 inches. The lower part is mottled clay loam to a depth of 65 inches.

The Burwell soil has high natural fertility. Typically, the surface layer is medium acid. Permeability is slow.

Included with this unit in mapping are some intermingled areas of Sobol and Wister soils. The included soils make up 10 percent of the unit.

The soils in this unit have medium to high potential for cultivated crops and pasture grasses and low potential for trees. They have fair tilth and can be worked throughout a moderate range of moisture conditions. The root zone is deep. Soil tilth can be improved by returning crop residue to the soil and by keeping tillage to a minimum. These soils have low potential for most urban uses.

Wetness, shrink swell and low strength are limitations that can be overcome by good planning and design.

Capability subclass IIIe; not assigned to a woodland suitability group; Loamy Prairie range site.

35—Moyers, Wister, and Burwell soils, gullied. This map unit consists of deep, moderately well drained, very gently sloping to gently sloping Moyers, Wister, and Burwell soils in valleys on gullied uplands. Slopes are 1 to 5 percent. Gullies more than 3 feet deep occur at intervals of 50 to 200 feet. Some of the soil areas could have been shown separately at the scale selected for mapping, but they were not because management needs are similar. Individual areas of the map unit are 5 to 80 acres.

The Moyers soil makes up 40 percent of the map unit. Typically, the surface layer is very dark grayish brown loam 9 inches thick. The next layer is dark brown silty clay loam to a depth of 14 inches. The upper part of the subsoil is yellowish brown mottled silty clay loam to 24 inches. The middle part is strong brown mottled clay to 32 inches. The lower part, to a depth of 55 inches, is yellowish brown and mottled, and it becomes gray with increasing depth. The underlying material is gray shale to a depth of 60 inches.

The Moyers soil has medium natural fertility. Typically, it is medium acid in the surface layer. Permeability is slow.

The Wister soil makes up 35 percent of the map unit. Typically, the surface layer is dark grayish brown silt loam 8 inches thick. The upper part of the subsoil is dark yellowish brown mottled clay to a depth of 24 inches. The lower part is grayish brown mottled clay to 58 inches. The underlying material is gray shale to 65 inches.

The Wister soil has medium natural fertility. Typically, the surface layer is medium acid. Permeability is very slow.

The Burwell soil makes up 20 percent of the acreage in the map unit. Typically, the surface layer is very dark grayish brown loam 14 inches thick. The subsurface layer is dark brown loam to a depth of 22 inches. The upper part of the subsoil is brown loam to 30 inches. The lower part is yellowish brown mottled clay loam to a depth of 70 inches.

The Burwell soil has medium natural fertility. Typically, the surface layer is medium acid. Permeability is slow.

Included in mapping are small areas of Sobol soils. The included soils make up 5 percent of the unit.

The soils in this map unit have low potential for cultivated crops or trees and medium potential for pasture grasses. They have low potential for most urban uses. Wetness, shrink swell, and low strength are limitations that can be overcome by planning and design.

Capability subclass VIe; not assigned to a woodland suitability group; Eroded Prairie range site.

36—Nahatche Variant sandy loam. This deep, poorly drained, nearly level soil is on flood plains of creeks. Individual areas are 20 to 100 acres. The soil is frequently inundated for very brief periods.

Typically, the surface layer is pale brown sandy loam to a depth of 10 inches. The underlying material is stratified dark grayish brown mottled clay loam, grayish brown mottled clay loam, and dark gray mottled clay to a depth of 80 inches. These soils are saturated in winter and in spring.

This soil is medium in natural fertility. The surface layer is strongly acid. Permeability is very slow.

Included with this soil in mapping are small areas of Boggy soils. The included soils make up 10 percent of this map unit.

This soil has low potential for cultivated crops and high potential for pasture grasses and trees. It has low potential for most urban uses. Flooding and wetness are the major limitations.

Capability subclass Vw; woodland suitability group 2w; not assigned to a range site.

37—Pushmataha loam. This deep, somewhat poorly drained, nearly level soil is on flood plains of rivers and creeks in the Ouachita Mountains. Individual areas are 5 to 80 acres. The soil is occasionally inundated for very brief periods.

Typically, the surface layer is dark brown mottled loam 12 inches thick. The next layer is brown mottled loam to a depth of 22 inches. The underlying material is stratified brown mottled loam and light gray mottled silt loam to a depth of 60 inches.

This soil is medium in natural fertility. Typically, the surface layer is medium acid. Permeability is moderate. Most plants grown on this soil respond well to fertilizer. The soil has fair tilth and can be worked throughout a moderate range of moisture conditions. Tilth can be maintained by returning crop residue to the soil and by keeping tillage to a minimum.

Included with this soil in mapping are small areas of Dela and Guyton soils. The included soils make up less than 10 percent of the map unit.

This soil has high potential for cultivated crops, trees, and pasture grasses. It has low potential for most urban uses. Flooding and wetness are the major limitations.

Capability subclass IIw; woodland suitability group 2w; not assigned to a range site.

38—Pushmataha, Elysian, and Guyton soils. This map unit consists of nearly level to undulating Pushmataha, Elysian, and Guyton soils of the mounded flood plains. These soils are deep and somewhat poorly drained, moderately well drained, and poorly drained. Some areas of these soils could have been shown separately at the scale selected for mapping, but they were not because management needs are similar. The Pushmataha and Guyton soils are on the lower, nearly level

areas between mounds, and the Elysian soils are on the higher undulating mounds. Slopes are 0 to 3 percent. Individual areas of the map unit are 40 to 300 acres. The Pushmataha and Guyton soils are frequently flooded for very brief periods, but the Elysian soils are seldom flooded, if ever.

The Pushmataha soil is a somewhat poorly drained, nearly level soil of the flood plains. It makes up 30 percent of the map unit. Typically, the surface layer is dark brown loam 12 inches thick. The next layer is dark brown mottled loam to a depth of 30 inches. The underlying material is stratified brown mottled loam and light gray mottled silt loam to a depth of 60 inches.

The Pushmataha soil is medium in natural fertility. Typically, it is medium acid in the surface layer. Permeability is moderate.

The Elysian soil is a moderately well drained soil on undulating mounds. It makes up 30 percent of the unit. Typically, the surface layer is dark grayish brown fine sandy loam 5 inches thick. The next layer is strong brown fine sandy loam to a depth of 30 inches. The upper part of the subsoil, to a depth of 45 inches, is strong brown mottled loam that has streaks and tongues of pale brown fine sandy loam. The lower part to 70 inches is mottled loam that has streaks and tongues of light gray fine sandy loam.

The Elysian soil has medium natural fertility. Typically, the surface layer is medium acid. Permeability is moderate.

The Guyton soil is a poorly drained soil on nearly level flood plains. It is saturated in winter and in spring. It makes up 30 percent of the unit. Typically, the surface layer is dark brown silt loam 6 inches thick. The subsurface layer is grayish brown silt loam to a depth of 14 inches. The next layer extends to 20 inches. It is dark gray silty clay loam that has tongues of grayish brown silt loam. The subsoil is gray mottled silty clay loam to 66 inches.

The Guyton soil has medium natural fertility. Typically, the surface layer is medium acid. Permeability is very slow.

Included in mapping are small areas of Dela, Rexor, or Speer soils. The included soils make up 10 percent of the map unit.

The soils in this unit have low potential for cultivated crops, high potential for trees, and medium potential for pasture grasses. They have low potential for most urban uses. Flooding and wetness are the major limitations.

Capability subclass Vw; not assigned to a range site; Pushmataha soil in woodland suitability group 2w, Elysian soil in group 2o, and Guyton soil in group 2w.

39—Rexor loam. This deep, well drained, nearly level soil is on stream terraces of rivers and creeks. Individual areas are 10 to 70 acres. The soil is occasionally inundated for very brief periods.

Typically, the surface layer is brown loam 8 inches thick. The upper part of the subsoil, to a depth of 46 inches, is strong brown clay loam that has mottles in the lower part. The lower part of the subsoil is brown mottled loam to a depth of 66 inches.

The soil is medium in natural fertility. Typically, the surface layer is medium acid. Permeability is moderate. Most plants respond well to fertilizer and lime. The soil has fair tilth and can be worked throughout a moderate range of moisture conditions.

Included with this soil in mapping are small areas of Dela, Pushmataha, and Guyton soils. The included soils make up less than 10 percent of the unit.

This soil has high potential for cultivated crops, trees, and pasture grasses. Tilth can be maintained by returning crop residue to the soil. The soil has low potential for most urban uses. Flooding is the major limitation.

Capability subclass IIw; woodland suitability group 2o; not assigned to a range site.

40—Ruston loamy fine sand, 0 to 3 percent slopes. This deep, well drained, nearly level to very gently sloping soil is on uplands of the Coastal Plain. Individual areas are 5 to 50 acres.

Typically, the surface layer is dark grayish brown loamy fine sand 3 inches thick. The subsurface layer is pale brown loamy fine sand to a depth of 17 inches. The upper part of the subsoil is yellowish red mottled sandy clay loam to 42 inches. The lower part to 62 inches is yellowish red mottled sandy clay loam that has vertical streaks of light brownish gray fine sandy loam.

This soil is low in natural fertility. The surface layer is medium acid. Permeability is moderate. Most plants respond well to fertilizer and lime. The soil has good tilth. Plant roots can easily penetrate to great depths.

Included with this soil in mapping are small areas of Glenpool soils. The included soils make up 20 percent of the unit.

This soil has medium potential for cultivated crops, pasture grasses, and trees. Tilth can be maintained by returning crop residue to the soil. Potential is high for most urban uses. Low strength, seepage, and sandy texture are limitations that can be overcome by planning and design.

Capability subclass IIIe; woodland suitability group 3o; not assigned to a range site.

41—Ruston loamy fine sand, 3 to 8 percent slopes. This deep, well drained, gently sloping to sloping soil is on uplands of the Coastal Plain. Individual areas are 5 to 300 acres.

Typically, the surface layer is brown loamy fine sand to a depth of 5 inches. The subsurface layer is pale brown loamy fine sand to a depth of 17 inches. The upper part of the subsoil to a depth of 40 inches is yellowish red and reddish brown sandy clay loam that is mottled in the lower part. The lower part of the subsoil to 65 inches is

red mottled sandy clay loam that has vertical streaks of light brownish gray fine sandy loam.

This soil is low in natural fertility. The surface layer is medium acid. Permeability is moderate. Because erosion is a hazard, pasture grasses should be included in the crop rotation. The soil has good tilth, and roots readily penetrate to great depths.

Included with this soil in mapping are small areas of Glenpool soils. The included soils make up 20 percent of the unit.

This soil has medium potential for cultivated crops, pasture grasses, and trees. Tilth can be maintained by returning crop residue to the soil. Potential is high for most urban uses. Low strength, seepage, and sandy texture are limitations that can be overcome by good planning and design.

Capability subclass IVe; woodland suitability group 3o; not assigned to a range site.

42—Ruston fine sandy loam, 1 to 3 percent slopes. This deep, well drained, very gently sloping soil is on uplands of the Coastal Plain. Individual areas are 5 to 30 acres.

Typically, the surface layer is grayish brown fine sandy loam 4 inches thick. The subsurface layer is pale brown fine sandy loam to a depth of 12 inches. The upper part of the subsoil is yellowish red sandy clay loam to a depth of 47 inches. The lower part to 66 inches is red mottled sandy clay loam that has vertical streaks of light gray fine sandy loam.

This soil has low natural fertility. The surface layer is medium acid. Permeability is moderate. Plants respond well to fertilizer and lime. This soil has good tilth and can be worked throughout a wide range of moisture conditions.

Included with this soil in mapping are small areas of Kullit and Bernow soils. The included soils make up 20 percent of the unit.

This soil has high potential for cultivated crops and pasture grasses and medium potential for trees. Tilth can be maintained by returning crop residue to the soil. Potential is high for most urban uses. Low strength and seepage are limitations that can be overcome by good planning and design.

Capability subclass IIe; woodland suitability group 3o; not assigned to a range site.

43—Ruston fine sandy loam, 3 to 5 percent slopes. This deep, well drained, gently sloping soil is on uplands of the Coastal Plain. Individual areas are 5 to 100 acres.

Typically, the surface layer is brown fine sandy loam to a depth of 5 inches. The subsurface layer is pale brown fine sandy loam to a depth of 11 inches. The upper part of the subsoil is red and dark red sandy clay loam to 44 inches. The lower part to 64 inches is red sandy clay loam that has vertical streaks of light gray fine sandy loam.

This soil is low in natural fertility. The surface layer is medium acid. Permeability is moderate. Plants respond well to fertilizer and lime. This soil has good tilth and can be worked throughout a wide range of moisture conditions.

Included in mapping are small areas of Smithdale, Saffell, Bernow, and Romia soils. The included soils make up 20 percent of the unit.

This soil has high potential for cultivated crops and pasture grasses and medium potential for trees. Tilth can be maintained by returning crop residue to the soil. Potential is high for most urban uses. Low strength and seepage are limitations that can be overcome by good planning and design.

Capability subclass IIIe; woodland suitability group 3o; not assigned to a range site.

44—Saffell gravelly sandy loam, 1 to 5 percent slopes. This is a deep, well drained, very gently to gently sloping soil on uplands. Individual areas are 5 to 100 acres.

Typically, the surface layer is dark grayish brown gravelly sandy loam 3 inches thick. The subsurface layer is brown very gravelly sandy loam to a depth of 9 inches. The next layer is brown very gravelly sandy clay loam to 15 inches. The upper part of the subsoil is strong brown very gravelly sandy clay loam to 32 inches. The lower part is strong brown very gravelly sandy loam to 50 inches. The underlying material is strong brown very gravelly sandy loam to a depth of 60 inches.

This soil is low in natural fertility. The surface layer is medium acid. Permeability is moderate.

Included with this soil in mapping are similar soils that are less than 35 percent or more than 70 percent gravel in some part of the subsoil. The included soils make up 15 percent of the unit.

This soil has medium potential for cultivated crops and pasture grasses and low potential for trees. If it is used for cultivated crops, erosion is a hazard. Pasture grasses should be a part of the cropping system. The soil has high potential for most urban uses.

Capability subclass IIIe; woodland suitability group 4f; not assigned to a range site.

45—Saffell gravelly sandy loam, 5 to 20 percent slopes. This is a deep, well drained, sloping to moderately steep soil on uplands. Individual areas are 20 to 300 acres.

Typically, the surface layer is dark grayish brown gravelly sandy loam 1 inch thick. The subsurface layer is yellowish brown gravelly sandy loam to a depth of 11 inches. The next layer is yellowish red very gravelly sandy clay loam to 22 inches. The subsoil is red very gravelly sandy clay loam to 48 inches. The underlying material is yellowish brown mottled very gravelly sandy loam to a depth of 60 inches.

The soil is low in natural fertility. The surface layer is medium acid. Permeability is moderate.

Included with this soil in mapping are similar soils that are less than 35 percent or more than 70 percent gravel in some part of the subsoil. The included soils make up 15 percent of the unit.

This soil has low potential for cultivated crops and trees and medium potential for pasture grasses. It has medium potential for most urban uses. Slope is the major limitation.

Capability subclass VIe; woodland suitability group 4f; not assigned to a range site.

46—Shermore fine sandy loam, 1 to 3 percent slopes. This is a deep, moderately well drained, very gently sloping soil. It is on uplands in the valleys of the Ouachita Mountains. Individual areas are 5 to 50 acres.

Typically, the surface layer is dark grayish brown fine sandy loam 2 inches thick. The subsurface layer is brown sandy loam to a depth of 11 inches. The upper part of the subsoil is yellowish brown mottled sandy clay loam to 30 inches. The lower part is coarsely mottled sandy clay loam to a depth of 65 inches.

The soil is low in natural fertility. The surface layer is medium acid. Permeability is moderate. Most plants respond well to fertilizer and lime. The soil has fair tilth and can be worked throughout a moderate range of moisture conditions.

Included with this soil in mapping are areas of similar soils that are 20 to 60 inches deep over the parent material. The included soils make up 20 percent of the unit.

This soil has high potential for cultivated crops and pasture grasses and medium potential for trees. Tilth can be maintained by returning crop residue to the soil. Potential is medium for most urban uses. Wetness and low strength are limitations that can be overcome by good planning and design.

Capability subclass IIe; woodland suitability group 3o; not assigned to a range site.

47—Shermore fine sandy loam, 3 to 5 percent slopes. This is a deep, moderately well drained, gently sloping soil. It is on uplands in the valleys of the Ouachita Mountains. Individual areas are 10 to 100 acres.

Typically, the surface layer is brown fine sandy loam 4 inches thick. The subsurface layer is yellowish brown fine sandy loam to a depth of 12 inches. The upper part of the subsoil is strong brown and yellowish brown sandy clay loam to 22 inches. The middle part is yellowish brown mottled sandy clay loam to 30 inches. The lower part is coarsely mottled sandy clay loam to a depth of 65 inches.

This soil is low in natural fertility. The surface layer is medium acid. Permeability is moderate. Most plants respond well to fertilizer and lime. Erosion is a problem if cultivated crops are grown. The soil has fair tilth and can be worked throughout a moderate range of moisture conditions.

Included with this soil in mapping are areas of similar soils that are 20 to 60 inches deep over the parent material. The included soils make up 20 percent of the unit.

This soil has high potential for cultivated crops and pasture grasses and medium potential for trees. Tilth can be maintained by returning crop residue to the soil. Potential is medium for most urban uses. Wetness and low strength are limitations that can be overcome by good planning and design.

Capability subclass IIIe; woodland suitability group 3o; not assigned to a range site.

48—Shermore fine sandy loam, 2 to 5 percent slopes, eroded. This is a deep, eroded, moderately well drained, very gently sloping to gently sloping soil. It is on uplands in the valleys of the Ouachita Mountains. On about 50 percent of the acreage, the surface layer has been thinned by erosion and is mixed with the subsoil. Individual areas of the soil are 5 to 100 acres.

Typically, the surface layer is brown fine sandy loam 5 inches thick. The upper part of the subsoil is strong brown sandy clay loam to a depth of 12 inches. The lower part is coarsely mottled sandy clay loam to 65 inches.

This soil is low in natural fertility. The surface layer is medium acid. Permeability is moderate. Most plants respond well to fertilizer and lime. Because this soil is subject to erosion, pasture grasses are needed in the cropping system. The soil has fair tilth and can be worked throughout a moderate range of moisture conditions.

Included with this soil in mapping are areas of similar soils that are 20 to 60 inches deep over the parent material. The included soils make up 20 percent of the unit.

This soil has medium potential for cultivated crops, trees, and pasture grasses. Tilth can be maintained by returning crop residue to the soil. Potential is medium for most urban uses. Wetness and low strength are limitations that can be overcome by good planning and design.

Capability subclass IIIe; woodland suitability group 3o; not assigned to a range site.

49—Sherwood-Zafra association, gently sloping. This association consists of deep and moderately deep, well drained Sherwood and Zafra soils. These soils occur in a regular and repeating pattern on uplands in the Ouachita Mountains. The Sherwood soil is on side slopes, and the Zafra soil is on ridge crests. Individual areas of the unit are 10 to 200 acres.

The Sherwood soil is deep. It makes up 65 percent of each mapped area. Typically, the surface layer is dark grayish brown fine sandy loam 3 inches thick. The sub-

surface layer is pale brown fine sandy loam to a depth of 8 inches. The upper part of the subsoil is yellowish red gravelly sandy clay loam to 42 inches. The lower part is yellowish red gravelly sandy loam to 55 inches. The underlying material is hard, tilted sandstone to a depth of 60 inches.

The Zafra soil is moderately deep and deep. It makes up 20 percent of each mapped area. Typically, the surface layer is dark grayish brown fine sandy loam 4 inches thick. The subsurface layer is pale brown fine sandy loam to a depth of 9 inches. The upper part of the subsoil is yellowish red very gravelly sandy clay loam to 40 inches. The lower part is yellowish red very gravelly sandy loam to a depth of 55 inches. The underlying material is hard, tilted sandstone to 60 inches.

Both soils are low in natural fertility. They are medium acid in the surface layer. Permeability is moderate.

Included in mapping are soils that are similar to the Sherwood soil but are less than 30 inches deep over sandstone. The included soils make up 15 percent of the unit.

The soils in this association have medium potential for cultivated crops, pasture grasses, and trees. Most plants respond favorably to fertilizer and lime. These soils have good tilth and can be worked throughout a wide range of moisture conditions. Tilth can be maintained by returning crop residue to the soil. Potential is medium for most urban uses. Low strength and depth to rock are limitations that can be overcome by good planning and design.

Capability subclass IVe; woodland suitability group 3o; not assigned to a range site.

50—Sherwood-Zafra association, sloping. This association consists of deep and moderately deep, well drained Sherwood and Zafra soils. The soils occur in a regular and repeating pattern. They are in the Ouachita Mountains. Slopes range from 5 to 12 percent. The Sherwood soil is on the side slopes and the Zafra soil is on the ridge crests. Individual areas of the unit are 10 to 200 acres.

The Sherwood soil is deep. It makes up 60 percent of each mapped area. Typically, the surface layer is dark grayish brown fine sandy loam 3 inches thick. The subsurface layer is strong brown fine sandy loam to a depth of 9 inches. The upper part of the subsoil is yellowish red gravelly sandy clay loam to 40 inches. The lower part is yellowish red gravelly sandy loam to 50 inches. The underlying material to 60 inches is sandstone that is tilted more than 20 degrees from horizontal.

The Sherwood soil is low in natural fertility. It is medium acid in the surface layer. Permeability is moderate.

The Zafra soil is moderately deep and deep. It makes up 25 percent of each mapped area. Typically, the surface layer is dark grayish brown fine sandy loam 2 inches thick. The subsurface layer is pale brown fine sandy loam to a depth of 8 inches. The next layer is yellowish red very gravelly fine sandy loam to 16 inches. The upper part of the subsoil is yellowish red very gravelly sandy clay loam to a depth of 24 inches. The lower part is strong brown very gravelly sandy loam to 32 inches. The underlying material is sandstone that is tilted more than 20 degrees from horizontal.

The Zafra soil is low in natural fertility. It is medium acid in the surface layer. Permeability is moderate.

Included in mapping are areas of soils that are similar to the Sherwood soil but are less than 30 inches deep over sandstone. The included soils make up 15 percent of the map unit.

The soils in this association have medium potential for cultivated crops, pasture grasses, and trees. They have medium potential for most urban uses. Low strength and depth to rock are limitations that can be overcome by good planning and design.

Capability subclass VIe; woodland suitability group 3o; not assigned to a range site.

51—Smithdale fine sandy loam, 5 to 12 percent slopes. This deep, well drained, sloping and strongly sloping soil is on uplands of the Coastal Plain. Individual areas are 20 to 400 acres.

Typically, the surface layer is brown fine sandy loam to a depth of 4 inches. The subsurface layer is pale brown fine sandy loam to a depth of 9 inches. The upper part of the subsoil is yellowish red, dark red, and red sandy clay loam to 40 inches. The lower part to 65 inches is red sandy clay loam that has vertical streaks of light gray fine sandy loam.

This soil is low in natural fertility. The surface layer is medium acid. Permeability is moderate. Because erosion is a hazard, pasture grasses should be a part of the crop rotation. The soil has good tilth, and roots readily penetrate the subsoil.

Included in mapping are small areas of Bernow, Romia, Ruston, or Saffell soils. The included soils make up 20 percent of the map unit.

This soil has medium potential for cultivated crops, pasture grasses, and trees. Tilth can be maintained by returning crop residue to the soil. Potential is high for most urban uses. Low strength and seepage are limitations that can be overcome by good planning and design.

Capability subclass IVe; woodland suitability group 3o; not assigned to a range site.

52—Sobol clay loam, 3 to 5 percent slopes. This moderately deep, moderately well drained, gently sloping soil is on uplands in the valleys of the Ouachita Mountains. Individual areas are 5 to 80 acres.

Typically, the surface layer is dark grayish brown clay loam 10 inches thick. The next layer is dark grayish brown clay loam to a depth of 17 inches. The upper part of the subsoil is mottled clay to 29 inches. The lower

part is gray mottled clay to 39 inches. The underlying material is gray shale that is tilted 20 degrees from horizontal.

This soil is medium in natural fertility. Typically, the surface layer is neutral. Permeability is slow. This soil has fair tilth and can be worked throughout a moderate range of moisture conditions. Roots do not easily penetrate the lower part of the subsoil.

Included in mapping are small areas of Alikchi, Alikchi variant, Tuskahoma, and Wister soils. The included soils make up 20 percent of the unit.

This soil has medium potential for cultivated crops and pasture grasses and low potential for trees. Soil tilth can be maintained by returning crop residue to the soil and by keeping tillage to a minimum. Potential is low for most urban uses. Wetness, slow permeability, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass IVe; not assigned to a woodland suitability group; Loamy Prairie range site.

53—Sobol-Tuskahoma association, strongly sloping. This association consists of moderately deep and shallow, moderately well drained Sobol and Tuskahoma soils. These soils are on uplands in valleys of the Ouachita Mountains. The Sobol soil generally is on the lower slopes below areas of the Tuskahoma soil. Slopes are 8 to 12 percent. Individual areas of the unit are 10 to 300 acres. Individual areas of each soil are 5 to 30 acres.

The Sobol soil is moderately deep. It makes up 50 percent of each mapped area. Typically, the surface layer is very dark grayish brown loam 7 inches thick. The next layer is dark grayish brown clay loam to a depth of 14 inches. The upper part of the subsoil is red mottled clay to 25 inches. The lower part is gray mottled clay to 30 inches. The underlying material to 35 inches is gray shale that is tilted 20 degrees from horizontal.

The Sobol soil is medium in natural fertility. Typically, the surface layer is neutral. Permeability is slow.

The Tuskahoma soil is shallow. It makes up 40 percent of each mapped area. Typically, the surface layer is dark grayish brown loam 4 inches thick. The upper part of the subsoil is reddish brown mottled clay to a depth of 10 inches. The lower part is olive gray mottled shaly clay to 16 inches. The underlying material is olive gray shale that has thin layers of shaly clay, and it is tilted 50 degrees from horizontal.

The Tuskahoma soil is medium in natural fertility. Typically, it is slightly acid in the surface layer. Permeability is very slow.

Included in mapping are areas of Clebit and Wister soils. The included soils make up 10 percent of the unit.

The soils in this map unit have low potential for cultivated crops and trees and medium potential for pasture grasses. They have low potential for most urban uses. Wetness, the slow or very slow permeability, shrink swell, low strength, and depth to rock are limitations that can be overcome by good planning and design.

Capability subclass VIe; Tuskahoma soil in woodland suitability group 5d, Shallow Savannah range site; Sobol soil not assigned to a woodland suitability group, Loamy Prairie range site.

54—Speer loam, 1 to 3 percent slopes. This deep, well drained, very gently sloping soil is on stream terraces of creeks and rivers in the Ouachita Mountains. Individual areas are 5 to 80 acres. The soil is flooded rarely and for very brief periods.

Typically, the surface layer is brown loam 9 inches thick. The next layer is yellowish brown loam to a depth of 15 inches. The upper part of the subsoil is reddish brown clay loam to 24 inches. The lower part is strong brown clay loam in the upper part and strong brown mottled loam in the lower part to 55 inches. The underlying material is mottled loam to a depth of 72 inches.

This soil is medium in natural fertility. Typically, the surface layer is medium acid. Permeability is moderate. Plants respond well to fertilizer and lime. This soil has fair tilth and can be worked throughout a wide range of moisture conditions.

Included with this soil in mapping are small areas of Dela, Elysian, and Guyton soils. The included soils make up less than 10 percent of the unit.

This soil has high potential for cultivated crops, pasture grasses, and trees. Tilth can be maintained by returning crop residue to the soil. Potential is low for most urban uses. Flooding is the major limitation.

Capability subclass IIe; woodland suitability group 2o; not assigned to a range site.

55—Tuskahoma-Clebit-Sobol association, strongly sloping. This map unit consists of shallow and moderately deep, moderately well drained and well drained soils on uplands in the Ouachita Mountains. The Tuskahoma soil is on upper slopes and crests; the Clebit soil is on crests; and the Sobol soil is on side slopes. Slopes are 8 to 12 percent. Individual areas of the unit are several hundred acres.

The Tuskahoma soil is shallow and moderately well drained. It makes up 45 percent of each mapped area. Typically, the surface layer is dark grayish brown loam 4 inches thick. The upper part of the subsoil is dark yellowish brown mottled clay to a depth of 12 inches. The lower part is gray mottled shaly clay to 18 inches. The underlying material to 25 inches is gray shale that has thin layers of shaly clay. It is tilted 40 degrees from horizontal.

The Tuskahoma soil is medium in natural fertility. Typically, it is medium acid in the surface layer. Permeability is very slow.

The Clebit soil is shallow and well drained. It makes up 23 percent of each mapped area. Typically, the surface layer is very dark grayish brown very gravelly fine sandy

loam 5 inches thick. The subsoil is brown very gravelly fine sandy loam to a depth of 12 inches. The underlying material is hard fractured sandstone that is tilted 40 degrees from horizontal.

The Clebit soil is low in natural fertility. The surface layer is medium acid. Permeability is moderately rapid.

The Sobol soil is moderately deep and moderately well drained. It makes up 19 percent of each mapped area. Typically, the surface layer is dark grayish brown loam 6 inches thick. The next layer is yellowish brown clay loam to a depth of 13 inches. The upper part of the subsoil is yellowish brown mottled clay to 24 inches. The lower part is gray mottled clay to 32 inches. The underlying material is gray shale that is tilted 40 degrees from horizontal.

The Sobol soil is medium in natural fertility. The surface layer is neutral. Permeability is slow.

Included in mapping are outcrops of sandstone bedrock at or above the surface. The included Rock outcrop makes up 3 percent of the unit.

The soils in this unit have low potential for cultivated crops, pasture grasses, or trees. They have low potential for most urban uses. Depth to rock, wetness, slow or very slow permeability, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass VIe; Tuskahoma and Clebit soils in woodland suitability group 5d, Shallow Savannah range site; Sobol soil not assigned to a woodland suitability group, Loamy Prairie range site.

56—Udorthents. Udorthents are mostly in borrow pits. The pits are in areas of Saffell and Ceda soils, but soil material has been excavated for building roads, dams, foundations, and other similar structures. Individual areas are 2 to 15 acres.

Udorthents have no distinct soil profile. One area has 60 inches of strong brown very gravelly sandy loam. The gravel makes up 65 to 90 percent of the volume. The material is strongly acid. Udorthents are in pits 5 to 30 feet deep that have vertical sides and a very gently sloping to sloping bottom. The soil material consists of gravelly loamy sediments. Reaction is mostly medium acid to very strongly acid. Included with Udorthents in mapping are minor areas of Saffell and Ceda soils.

Udorthents are suited to pasture grasses and trees. They are also suited to wildlife habitat.

The main concerns of management are steep slopes, the hazard of erosion, and maintenance of fertility. Management is needed to establish or improve stands of vegetation. Potential is low for most urban uses. Flooding is the major limitation.

Capability subclass VIIs; not assigned to a woodland suitability group or range site.

57—Wister-Burwell complex, 0 to 1 percent slopes. This complex consists of small areas of deep, moderately well drained, nearly level Wister and Burwell soils on uplands. The soil areas are so intermingled that they could not be shown separately at the scale selected for mapping. The Wister soil is between mounds, and the Burwell soil is on mounds. Individual areas of the unit are 30 to 200 acres.

The Wister soil makes up 70 percent of each mapped area. Typically, the surface layer is very dark gray silt loam 5 inches thick. The subsurface layer is grayish brown silt loam to a depth of 9 inches. The upper part of the subsoil is light olive brown mottled clay to 13 inches. The lower part is olive brown clay to 52 inches. The underlying material to 60 inches is gray shale that is tilted 30 degrees from horizontal.

The Wister soil has medium natural fertility. The surface layer is strongly acid. Permeability is very slow.

The Burwell soil makes up 20 percent of each mapped area. Typically, the surface layer is very dark grayish brown loam 16 inches thick. The subsurface layer is brown loam to a depth of 26 inches. The upper part of the subsoil, to a depth of 42 inches, is yellowish brown clay loam that is mottled in the lower part. The lower part of the subsoil is grayish brown mottled clay loam to a depth of 64 inches.

The Burwell soil has high natural fertility. Typically, the surface layer is medium acid. Permeability is slow.

Included with this unit in mapping are areas of Moyers soils and soils that are similar to the Wister soil but are more than 60 inches deep over shale. The included soils make up 10 percent of the map unit.

The soils in this unit have high potential for cultivated crops and pasture grasses and low potential for trees. They have fair tilth and can be worked throughout a moderate range of moisture conditions. The root zone is deep. Soil tilth can be improved by returning crop residue to the soil and by keeping tillage to a minimum. Potential is low for most urban uses. Wetness, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass IIw; not assigned to a woodland suitability group; Wister soil in Claypan Prairie range site, Burwell soil in Loamy Prairie range site.

58—Wister-Burwell complex, 1 to 3 percent slopes. This complex consists of small areas of deep, moderately well drained, very gently sloping Wister and Burwell soils on uplands. The soil areas are so intermingled that they could not be shown separately at the scale selected for mapping. The Wister soil is between mounds, and the Burwell soil is on mounds. Individual areas of the unit are 30 to 200 acres.

The Wister soil makes up 70 percent of each mapped area. Typically, the surface layer is very dark grayish brown silt loam 9 inches thick. The subsurface layer is grayish brown silt loam to a depth of 14 inches. The subsoil is olive brown mottled clay to 52 inches. The

underlying material to 60 inches is olive brown shale that is tilted 20 degrees from horizontal.

The Wister soil has medium natural fertility. Typically, the surface layer is medium acid. Permeability is very slow.

The Burwell soil makes up 20 percent of each mapped area. Typically, the surface layer is dark brown loam 16 inches thick. The subsurface layer is brown loam to a depth of 24 inches. The upper part of the subsoil is brown mottled silty clay loam to 29 inches. The middle part is olive brown mottled clay loam to 38 inches. The lower part is olive mottled clay to a depth of 65 inches.

The Burwell soil has high natural fertility. Typically, the surface layer is medium acid. Permeability is slow.

Included with this unit in mapping are areas of Moyers soils and soils that are similar to the Wister soil but are more than 60 inches deep over shale. The included soils make up 10 percent of the unit.

The soils in this unit have high potential for cultivated crops and pasture grasses and low potential for trees. They have fair tilth and can be worked throughout a moderate range of moisture conditions. Soil tilth can be improved by returning crop residue to the soil and by keeping tillage to a minimum. Potential is low for most urban uses. Wetness, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass IIIe; not assigned to a woodland suitability group; Wister soil in Claypan Prairie range site, Burwell soil in Loamy Prairie range site.

59—Wrightsville-Elysian complex, undulating. This complex consists of small areas of deep, poorly drained and moderately well drained, nearly level to undulating Wrightsville and Elysian soils on terraces. The soil areas are so intermingled that they could not be shown separately at the scale selected for mapping. The Wrightsville soil is between mounds in nearly level areas, and the Elysian soil is on undulating mounds. Slopes are 0 to 3 percent. Individual areas of the unit are 5 to 100 acres.

The Wrightsville soil is poorly drained and is saturated in winter and in spring. It makes up 60 percent of each mapped area. Typically, the surface layer is dark grayish brown silt loam 3 inches thick. The subsurface layer is light gray mottled silt loam to a depth of 11 inches. The next layer, to 26 inches, is gray mottled silty clay that has vertical streaks of light gray silt loam. The subsoil is gray mottled silty clay to a depth of 48 inches. The underlying material is gray mottled silty clay to 60 inches.

The Wrightsville soil has medium natural fertility. The surface layer is strongly acid. Permeability is very slow.

The Elysian soil is moderately well drained. It makes up 20 percent of each mapped area. Typically, the surface layer is dark grayish brown fine sandy loam 7 inches thick. The next layer is strong brown fine sandy loam to a depth of 26 inches. The upper part of the subsoil, to 42 inches, is strong brown mottled loam that has vertical streaks of light gray fine sandy loam. The lower part of the subsoil is gray mottled silty clay to a depth of 65 inches.

The Elysian soil has medium natural fertility. Typically, it is medium acid in the surface layer. Permeability is moderate.

Included with this unit in mapping are areas of Guyton and Rexor soils. The included soils make up 20 percent of the unit.

The soils of this complex have medium potential for cultivated crops, trees, and pasture grasses. They have fair tilth and can be worked throughout a moderate range of moisture conditions. Soil tilth can be improved by returning crop residue to the soil and by keeping tillage to a minimum. Potential is low for most urban uses. Wetness, flooding, shrink swell, and low strength are limitations that can be overcome by good planning and design.

Capability subclass IIIw; not assigned to a range site; Wrightsville soil in woodland suitability group 3w, Elysian soil in group 2o.

60—Yanush cherty silt loam, 1 to 3 percent slopes. This deep, well drained, very gently sloping soil is on uplands in the Potatoe Hills of the Ouachita Mountains. Individual areas are 5 to 100 acres.

Typically, the surface layer is dark brown cherty silt loam 4 inches thick. The subsurface layer is yellowish brown cherty silt loam to a depth of 9 inches. The subsoil is yellowish red, very cherty clay loam to a depth of 75 inches.

This soil is low in natural fertility. Typically, it is medium acid in the surface layer. Permeability is moderate. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are areas of similar soils that are not cherty in the surface and subsurface layers. The included soils make up 20 percent of the unit.

This soil has medium potential for cultivated crops and pasture grasses and low potential for trees. Tilth can be maintained by returning crop residue to the soil. Potential is medium for most urban uses. Shrink swell is the major limitation that should be overcome by good planning and design.

Capability subclass IIIe; woodland suitability group 4f; not assigned to a range site.

61—Yanush cherty silt loam, 3 to 5 percent slopes. This deep, well drained, gently sloping soil is on uplands in the Potatoe Hills of the Ouachita Mountains. Individual areas are 5 to 100 acres.

Typically, the surface layer is dark brown cherty silt loam 4 inches thick. The subsurface layer is dark yellowish brown cherty silt loam to a depth of 16 inches. The upper part of the subsoil is dark reddish brown very

cherty silty clay loam to 20 inches. The lower part is yellowish red very cherty silty clay loam to a depth of 70 inches.

This soil is low in natural fertility. Typically, it is medium acid in the surface layer. Permeability is moderate. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are areas of similar soils that are not cherty in the surface and subsurface layers. The included soils make up 20 percent of the unit.

This soil has medium potential for cultivated crops and pasture grasses and low potential for trees. Tilth can be maintained by returning crop residue to the soil. Potential is medium for most urban uses. Shrink swell is the major limitation that should be overcome by good planning and design.

Capability subclass IVe; woodland suitability group 4f; not assigned to a range site.

62—Yanush cherty silt loam, 5 to 20 percent slopes. This deep, well drained, sloping to moderately steep soil is on uplands in the Potatoe Hills of the Ouachita Mountains. Individual areas are 20 to 200 acres.

Typically, the surface layer is brown cherty silt loam 4 inches thick. The subsurface layer is strong brown cherty silt loam to a depth of 8 inches. The subsoil is yellowish red very cherty silty clay loam to 70 inches.

This soil is low in natural fertility. Typically, it is neutral in the surface layer. Permeability is moderate.

Included with this soil in mapping are areas of similar soils that are not cherty in the surface and subsurface layers. The included soils make up 10 percent of the unit.

This soil has low potential for cultivated crops and trees and medium potential for pasture grasses. It has medium potential for most urban uses. Slope and shrink swell are limitations that can be overcome by good planning and design.

Capability subclass VIe; woodland suitability group 5f; not assigned to a range site.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, rangeland, and woodland, as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities, and for wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

Odos G. Henson, conservation agronomist, Soil Conservation Service, helped prepare this section.

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the sec-

tion "Soil maps for detailed planning." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

Crops

In cultivated areas in this county, management is needed that conserves moisture, controls erosion, improves fertility, supplies organic matter, and provides good tilth.

The only tillage needed is in preparing a seedbed and controlling weeds. Excessive tillage destroys soil structure and speeds up decomposition of organic matter.

Tillage can be kept to a minimum by using a long term cropping system that includes perennial grasses or deep-rooted legumes, by applying herbicides instead of cultivating to control weeds, and by reducing the fieldwork needed in preparing the seedbed and in planting and cultivating.

Crop residue left on the surface or worked partly into the surface protects the soil from erosion. Organic matter improves the tilth of the surface layer.

Soil erosion is the major problem on cropland. Erosion is a hazard if the slope is more than 2 percent. The productivity of a soil is reduced as the surface layer is lost through erosion. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as the Bosville soils. Erosion reduces productivity on soils that tend to be droughty, such as Glenpool soils. Erosion on farmland is also damaging because the sediment enters and pollutes streams. A conservation cropping system is needed to reduce soil loss.

Soil drainage is the major management need on some of the acreage used for crops and pasture. Unless artificially drained, the poorly drained soils are so wet that crops are damaged most years. Guyton soils are examples.

Soil fertility is low in most areas of the uplands. Most plants respond well to fertilizer and lime. Some field crops suited to the soils and climate are wheat, grain sorghum, soybeans, and peanuts.

Tame pasture

Much of the acreage in Pushmataha County is tame pasture (fig. 2). The trend is toward converting cropland and woodland to pasture. Small acreages of range also are being converted to pasture.

The principal grass is improved bermudagrass. Some of the better pastures of bermudagrass are overseeded with legumes, which provide additional plant food and increase the quality and quantity of forage (fig. 3).

Some bermudagrass pastures are overseeded with fescue. This grass mixture is especially suited to soils on flood plains where additional moisture is available. The mixture provides grazing in nearly all months and furnishes added protein to livestock when the bermudagrass is dormant.

Fescue, an important grass in the county (fig. 4), provides enough forage for grazing on soils that have large amounts of available mositure. The fescue and other forages furnish grazing and additional protein late in fall and in spring. If a vigorous stand is to be maintained, fescue should be fertilized early in spring and early in fall, and it should not be grazed in summer.

Bahiagrass, a deep rooted warm season perennial grass, is suited to the soils of Pushmataha County. It is better suited to soils of low fertility than are most perennial summer grasses. It responds well to high levels of fertility, especially nitrogen. It is best suited to deep, well drained loamy or sandy soils. Bahiagrass and bermudagrass furnish grazing at about the same time of year.

Weeping lovegrass is grown to a limited extent in the county. It is a warm season perennial bunch grass that is suited to well drained loamy and sandy soils. It begins growth earlier in spring and remains green later in fall than bermudagrass. It responds well to fertilizer, especially nitrogen. It becomes less palatable to cattle as it matures.

Sudangrass, an annual grass, can be seeded in some cropland areas to supplement permanent grasses. It provides grazing during summer, or the forage can be harvested for hay. In some areas, sudangrass is allowed to grow until frost and is grazed in winter. Fertilizer is needed for maximum growth.

Some areas of cropland are used for forage plants that supplement the permanent grasses. Small grain, for example, provides grazing and additional protein for livestock late fall and in spring. It should be seeded and fertilized late in summer or early in fall to obtain the maximum amount of forage. Small grain can be grazed until maturity. If the livestock are removed in spring, a seed crop can be harvested. Wheat, oats, barley, and rye are the main small grains used for grazing.

In managing tame pasture, the kind of soil must be considered, suitable plants selected, and the desired kind and stand of plants maintained. Rotation grazing lengthens the life of most tame pasture plants. Deferred grazing during the time that tame pasture plants are under the most stress is beneficial. It allows the plants to regain vigor by helping to maintain a large root system where food can be stored for the next growing season. Total production of forage is increased. Plant food that contains the proper elements not only makes pasture plants more vigorous but also increases forage production and lengthens the lifespan of plants. Legumes or commercial fertilizers furnish nitrogen to the plants. Unless legumes are grown with the grass, large amounts of plant food are needed, especially nitrogen. The acidity of the soil should be adjusted to the kinds of plants desired in the stand. The invasion of undesirable plants and weeds should be controlled. Brush control is essen-

tial in wooded areas. Mowing or spraying is sometimes needed.

A pasture program can be planned so that adequate forage is available during every month of the year. Figure 5 shows the percentage of growth each month for various kinds of forage plants. Bermudagrass, for example, makes 22 percent of its yearly growth during June.

Soils vary in their capacity to produce forage for grazing. The total yearly production per acre of various kinds of pasture plants on each soil is given in animal unit months (AUM) in table 5. An animal unit month is the amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for a period of 30 days. An acre of bermudagrass on Hamden fine sandy loam, 0 to 2 percent slopes, for example, furnishes grazing for one animal unit for 9 months.

The total yearly production of the pasture plants in AUM (as shown in table 5) and the growth the plant makes each month (as shown in figure 5) must be considered in planning a pasture program. Figure 5 shows that bermudagrass furnishes 22 percent of its annual forage during June. An acre of Hamden soils provides grazing for 1.98 animals in June, because its yearly production is 9 AUM (22 percent times 9 AUM equals 1.98 AUM). Therefore, a 50-acre pasture would furnish grazing for 99 animals (50 acres times 1.98 AUM equals 99 AUM) during June. Additional information is available at the local office of the Soil Conservation Service in Antlers or at the county extension office.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil or that a given crop is not commonly irrigated.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 6.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The estimated yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at two levels: capability class and subclass. These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability subclass is identified in the description of each soil map unit in the section "Soil maps for detailed planning."

Rangeland

Ernest C. Snook, range conservationist, Soil Conservation Service, helped prepare this section.

About 20 percent of Pushmataha County is range. Some farm income is derived from livestock, chiefly cattle. Cow-calf-steer operations are dominant.

On many ranches the forage produced on rangeland is supplemented by crop stubble and small grain. In winter the native forage is often supplemented with protein concentrate. Creep feeding of calves and yearlings to increase market weight is practiced on some ranches.

The native vegetation in many parts of the survey area has been greatly depleted by continued excessive use. Much of the acreage that was once open grassland is now covered with brush and weeds. The amount of forage produced may be less than half of that originally produced. Productivity of the range can be increased under management that is effective on specific kinds of soil and range sites.

Where climate and topography are about the same, differences in the kind and amount of vegetation that rangeland can produce are related closely to the kind of soil. Effective management is based on the relationships among soils, vegetation, and water.

Table 7 shows, for each kind of soil, the name of the range site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the expected percentage of each species in the composition of the potential natural plant community. Soils not listed cannot support a natural plant community of predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. The following are explanations of column headings in table 7.

A *range site* is a distinctive kind of rangeland that differs from other kinds of rangeland in its ability to produce a characteristic natural plant community. Soils that produce a similar kind, amount, and proportion of range plants are grouped into range sites (fig. 5). For those areas where the relationship between soils and vegetation has been established, range sites can be interpreted directly from the soil map. Properties that determine the capacity of the soil to supply moisture and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important.

Total production refers to the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year the amount and distribution of precipitation and the temperatures are such that growing conditions are substantially better than average; in a normal year these conditions are about average for the area; in an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight refers to the total air-dry vegetation produced per acre each year by the potential natural plant community. Vegetation that is highly palatable to livestock and vegetation that is unpalatable are included. Some of the vegetation can also be grazed extensively by wildlife.

Characteristic species of grasses, grasslike plants, forbs, and shrubs that make up most of the potential natural plant community on each soil are listed by common name. Under *Composition*, the expected proportion of each species is presented as the percentage, in air-dry weight, of the total annual production of herbaceous and woody plants. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season. Generally all of the vegetation produced is not used.

Range management requires, in addition to knowledge of the kinds of soil and the potential natural plant community, an evaluation of the present condition of the range vegetation in relation to its potential. Range condition is determined by comparing the present plant com-

munity with the potential natural plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the maximum production of vegetation, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

The major management concern on most of the rangeland is control of grazing so that the kinds and amounts of plants that make up the potential plant community are re-established. Controlling brush and minimizing soil erosion are also important management concerns. If sound range management based on the soil survey information and rangeland inventories is applied, the potential is good for increasing the productivity of range in the area.

Woodland management and productivity

Norman E. Smola, forester, Soil Conservation Service, helped prepare this section.

Most of Pushmataha County is wooded. Needleleaf forest types are dominant on the hills (fig. 6), and broadleaf types on the flood plains along rivers and creeks.

The value of wood products is substantial. Other benefits of woodland are grazing, wildlife habitat, recreation, natural beauty, and conservation of soil and water.

Table 8 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Map unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: x, w, t, d, c, s, f, and r.

In table 8 the soils are also rated for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of major soil limitations.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings. Plant competition is not considered in the ratings. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade or grow if openings are made in the tree canopy. The invading plants compete with native plants or planted seedlings by impeding or preventing their growth. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* means that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

The *potential productivity* of merchantable or *important trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Important trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

Woodland understory vegetation

Understory vegetation consists of grasses, forbs, shrubs, and other plants. Some types of forest, under proper management, can produce enough understory

vegetation to support grazing of livestock or wildlife, or both.

The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees, the density of the canopy, and the depth and condition of the forest litter. The density of the forest canopy affects the amount of light that understory plants receive during the growing season.

Table 9 shows, for each soil suitable for woodland, the potential for producing understory vegetation. The table also lists the common names of the characteristic vegetation that grows on a specified soil and the percentage composition, by air-dry weight, of each kind of plant. The kind and percentage of understory plants listed in the table are those to be expected where canopy density is most nearly typical of forests that yield the highest production of wood crops.

The total production of understory vegetation is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year the soil moisture is above average during the optimum part of the growing season; in a normal year soil moisture is average; and in an unfavorable year it is below average.

Engineering

Charles E. Bollinger, assistant state conservation engineer, Soil Conservation Service, helped prepare this section.

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 10 shows, for each kind of soil, the degree and kind of limitations for building site development; table 11, for sanitary facilities; and table 13, for water management. Table 12 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 10. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, and open ditches. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 10 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 10 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 11 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils

the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 11 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 12 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 16 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 12 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 16.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 13 the degree of soil limitation and soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the specified use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Aquifer-fed excavated ponds are bodies of water made by excavating a pit or dugout into a ground-water aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 13 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect

the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

The soils of the survey area are rated in table 14 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 14 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 11, and interpretations for dwellings without basements and for local roads and streets, given in table 10.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock or hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have few or no stones or boulders on the surface.

Wildlife habitat

Jerome F. Sykora, biologist, Soil Conservation Service, helped prepare this section.

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 15, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of

wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, lespedeza, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, and ragweed.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of native plants are oak, mulberry, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and persimmon. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, or foliage used by wildlife or that provide cover and shade for some species of wildlife. Major soil properties that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and moisture. Examples of shrubs are mountain-huckleberry, bitterbrush, red haw, and black haw.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, and rushes, sedges, and reeds.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail rabbit, and red fox.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, nutria, mink, and beaver.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record

the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features and engineering test data.

Engineering properties

Table 16 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 16 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 16 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested in the survey area, with group index numbers in parentheses, is given in table 19. The estimated classification, without group index numbers, is given in table 16. Also in table 16 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index is estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterburg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 17 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Salinity is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of the nonirrigated soils. The salinity of individual irrigated fields is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of individual fields can differ greatly from the value given in table 17. Salinity affects the suitability of a soil for crop production, its stability when used as a construction material, and its potential to corrode metal and concrete.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 18 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with

increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding; and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 18 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation are also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Cemented pans are hard subsurface layers, within a depth of 5 or 6 feet, that are strongly compacted (indurated). Such pans cause difficulty in excavation. The hardness of pans is similar to that of bedrock. A rippable pan can be excavated, but a hard pan generally requires blasting.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Engineering test data

The results of analyses of engineering properties of several typical soils of the survey area are given in table 19.

The data presented are for soil samples that were collected from carefully selected sites. The soil profiles sampled are typical of the series discussed in the section "Soil series and morphology." The soil samples were analyzed by the Oklahoma Department of Transportation laboratory.

The methods used in obtaining the data are listed by code in the next paragraph. Most of the codes, in parentheses, refer to the methods assigned by the American Association of State Highway and Transportation Officials. The codes for shrinkage and Unified classification are those assigned by the American Society for Testing and Materials.

The methods and codes are AASHTO classification (M-145-66); Unified classification (D-2487-66T); mechanical analysis (T88-57); liquid limit (T89-60); plasticity index (T90-56); moisture-density, method A (T99-57); and shrinkage (D-427).

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*4*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 20, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place.

Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Fluvent (*Fluv*, meaning Fluvial, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Udifluvents (*Udi*, meaning Udic horizons, plus *Fluvent*, the suborder of Entisols that have a Udic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Udifluvents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is coarse-loamy, siliceous, nonacid, thermic, Typic Udifluvents.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*3*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Alikchi series

The Alikchi series consists of moderately deep, poorly drained, slowly permeable soils in narrow valleys on uplands. These soils formed in material weathered from shale. They are saturated in winter and in spring and during other seasons of high rainfall. Slopes are 1 to 3 percent.

Alikchi soils are geographically closely associated with Tuskahoma, Clebit, Sobol, Sherwood, Zafra, and Shermore soils. Tuskahoma and Sobol soils are more sloping, more clayey, and better drained than Alikchi soils. Clebit soils are on higher lying sandstone ridges and are more shallow. Sherwood, Zafra, and Shermore soils are more sandy and better drained.

Typical pedon of Alikchi loam in a forested area of Alikchi loam, 1 to 3 percent slopes, 1 1/4 mile south of Albion, approximately 500 feet south and 200 feet west of northeast corner sec. 16, T. 2 N., R. 21 E.

A1g—0 to 5 inches; dark gray (10YR 4/1) loam; few fine distinct yellowish brown and dark yellowish brown mottles; weak fine granular structure; friable; many fine roots; medium acid; clear smooth boundary.

A2g—5 to 14 inches; grayish brown (10YR 5/2) loam; few fine faint light brownish gray mottles and few fine distinct yellowish brown mottles; weak fine granular structure; friable; many fine roots; medium acid; clear irregular boundary.

B21tg—14 to 21 inches; dark gray (10YR 4/1) silty clay loam; many fine, medium, and coarse distinct and prominent yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), yellowish red (5YR 5/6), and red (2.5YR 5/6) mottles; weak medium subangular blocky structure; firm; patchy clay films on faces of peds; common fine roots; tongues of grayish brown (10YR 5/2) loam extend through horizon; slightly acid; gradual smooth boundary.

B22tg—21 to 29 inches; gray (10YR 5/1) silty clay loam; many coarse distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; patchy clay films on faces of peds; few fine roots; tongues of grayish brown (10YR 5/2) loam extend through horizon; mildly alkaline; gradual smooth boundary.

B3g—29 to 40 inches; light gray (10YR 6/1) silty clay loam; many coarse distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; patchy clay films on faces of peds; fragments of shale less than 75 mm in diameter make up 10 percent by volume; mildly alkaline; clear wavy boundary.

Cr—40 to 45 inches; dark gray (5Y 4/1) fractured shale that is tilted from horizontal.

Solum thickness and depth to shale bedrock range from 20 to 40 inches. Reaction ranges from medium acid to strongly acid in the A horizon. The A1g horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. The A2g horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2.

The B2tg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It has mottles in shades of brown or red. Reaction ranges from slightly acid to mildly alkaline. The B3g horizon is similar to the B2tg horizon in color, texture, and reaction.

The Cr horizon is dark gray or olive gray rippable shale. The shale bedrock is tilted more than 20 degrees from horizontal.

Alikchi variant

The Alikchi variant consists of deep, poorly drained, slowly permeable soils in valleys and on foot slopes of the uplands. These soils formed in material weathered from shale. They are saturated in winter and in spring and during other seasons of high rainfall. Slopes are 0 to 2 percent. Soils of the Alikchi variant have a thicker solum and are deeper to bedrock than those of the Alikchi series.

Alikchi variant is geographically closely associated with Tuskahoma, Clebit, Sobol, Sherwood, Zafra, and Shermore soils. Tuskahoma and Sobol soils are more sloping, more clayey, and better drained than Alichi variant soils. Clebit soils are more shallow and on higher lying sandstone ridges. Shermore, Zafra, and Sherwood soils are more sandy and better drained.

Typical pedon of Alikchi variant silt loam in an area of Alikchi Variant silt loam, 0 to 2 percent slopes, 4 miles northeast of Antlers along U.S. Highway 271, 3 miles north along county road; approximately 1,600 feet east and 200 feet south of northwest corner sec. 6, T. 3 S., R. 17 E.

A1g—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct reddish brown mottles; weak fine granular structure; friable; many fine roots; medium acid; clear smooth boundary.

A2g—6 to 10 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct brownish yellow, olive yellow, strong brown, and red mottles; weak fine granular structure; friable; many fine roots; strongly acid; clear irregular boundary.

B21tg—10 to 32 inches; light gray (10YR 6/1) silty clay loam; many coarse distinct dark red (2.5YR 3/6) and red (2.5YR 4/6) mottles and common medium and fine distinct pale brown (10YR 6/3), strong brown (7.5YR 5/6), and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; many fine roots; few patchy clay films on faces of peds; tongues of light brownish gray (10YR 6/2) silt loam extend through horizon; strongly acid; gradual smooth boundary.

B22tg—32 to 55 inches; light gray (10YR 7/1) silty clay loam; common coarse distinct red (2.5YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few patchy clay films on faces of peds; tongues of light brownish gray (10YR 6/2) silt loam extend through horizon; strongly acid; abrupt wavy boundary.

Cr—55 to 60 inches; dark gray (10YR 4/1) fractured shale that is tilted from horizontal.

Solum thickness and depth to shale bedrock range from 40 to 60 inches. The A1g horizon has hue of 10YR, value of 3 to 5, and chroma of 1 and 2. Reaction ranges from slightly acid to strongly acid.

The B2tg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of brown, yellow, or red throughout the horizon. It is strongly acid to mildly alkaline.

The Cr horizon is dark gray or olive gray rippable shale. The shale bedrock is tilted more than 20 degrees from horizontal.

Bernow series

The Bernow series consists of deep, well drained, moderately permeable soils on uplands. These soils formed in material weathered from unconsolidated loamy and sandy material of the Southern Coastal Plain. Slopes are 1 to 12 percent.

Bernow soils are geographically closely associated with Romia, Bosville, Glenpool, Kullit, Hamden, Ruston, and Saffell soils. Romia soils have soft sandstone at a depth of 40 to 60 inches. Bosville, Kullit, and Hamden soils are more clayey in some part of the B horizon. Glenpool soils are more sandy in the A horizon. Ruston soils have lower base saturation. Saffell soils have a loamy-skeletal control section.

Typical pedon of Bernow fine sandy loam in an area of Bernow-Romia complex, 8 to 12 percent slopes, 6 miles west of Antlers, approximately 2,300 feet north and 50 feet east of southwest corner sec. 3, T. 4 S., R. 15 E.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; friable; many fine roots; medium acid; clear smooth boundary.

A2—3 to 10 inches; brown (10YR 5/3) fine sandy loam; weak medium granular structure; friable; strongly acid; clear smooth boundary.

B21t—10 to 30 inches; yellowish red (5YR 4/6) sandy clay loam; moderate medium subangular blocky structure breaking to fine subangular blocky; firm; clay films on faces of peds; very strongly acid; gradual smooth boundary.

B22t—30 to 50 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium distinct light gray (10YR 7/1) and strong brown (7.5YR 5/6) mottles; moderate, medium subangular blocky structure; firm; clay films on faces of peds; very strongly acid; gradual smooth boundary.

B&A'2—50 to 70 inches; B part is yellowish brown (10YR 5/4) sandy clay loam; weak coarse subangular blocky structure; firm; very strongly acid; clay films on sand grains; A part, 10 percent of the horizon is light gray (10YR 6/1) fine sandy loam; massive; very friable; very strongly acid.

Solum thickness is more than 60 inches. Reaction is slightly acid or medium acid in the A1 horizon and slightly acid to strongly acid in the A2 horizon. The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The A2 horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6.

The B21t horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 to 6, and chroma of 4 to 8. Some pedons are mottled in shades of brown or red. Reaction ranges from slightly acid to very strongly acid. The B22t horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 to 6, and chroma of 4 to 8. Mottles in shades of gray, brown, or red occur in most pedons. Reaction ranges from medium acid to very strongly acid.

The B part of the B&A'2 horizon has the same color range as the B22t horizon and is coarsely mottled in shades of red, yellow, brown, or gray. Reaction is strongly acid or very strongly acid. The A'2 part of the B&A'2 horizon makes up 5 to 15 percent of the matrix. It occurs as pockets, vertical streaks, or ped coatings. It has hue of 10YR, value of 6 or 7, and chroma of 1 or 2. Reaction is strongly acid or very strongly acid.

Bigfork series

The Bigfork series consists of moderately deep, well drained, moderately permeable soils on uplands. These soils formed in material weathered from chert. They are the steepest parts of the Potatoe Hills, which are part of the Ouachita Mountains. Slopes are 20 to 45 percent.

Bigfork soils are geographically closely associated with Yanush soils. Yanush soils formed in material weathered from cherty outwash material.

Typical pedon of Bigfork stony silt loam in a steep, forested area of Bigfork-Yanush association, about 4 miles north of Tuskahoma; approximately 1,100 feet west and 400 feet north of southeast corner sec. 1, T. 2 N., R. 19 E.

O1—1/2 inch to 0; very dark brown (10YR 2/2) litter of leaves and twigs.

A1—0 to 5 inches; yellowish brown (10YR 5/4) stony silt loam; moderate medium granular structure; friable; common very fine and fine roots inside peds; few medium and coarse roots inside peds; 10 percent stones by volume; 10 percent very coarse chert fragments and 40 percent coarse chert fragments by volume; strongly acid; clear smooth boundary.

B2t—5 to 35 inches; brown (7.5YR 5/4) stony silty clay loam; weak fine subangular blocky structure; friable; common fine roots inside peds; few fine to coarse roots between peds; patchy clay films on faces of peds; 5 percent stones by volume; 10 percent very coarse chert fragments and 35 percent coarse chert fragments by volume; very strongly acid; abrupt irregular boundary.

R—35 to 40 inches; hard chert tilted 35 degrees from horizontal.

Solum thickness ranges from 20 to 40 inches. Reaction ranges from slightly acid to strongly acid in the A1 horizon. The A1 horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4.

The B2t horizon has hue of 5YR, 7.5YR, or 10YR, value of 3 to 5, and chroma of 4 to 6. Reaction ranges from medium acid to very strongly acid.

Boggy series

The Boggy series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains along narrow drainageways and creeks of the Coastal Plain. These soils formed in material weathered from recent sediments. They are saturated for short periods in winter and in spring. Slopes are 0 to 1 percent. The soils are slightly undulating in some areas.

Boggy soils are geographically closely associated with Nahatche variant soils. Nahatche variant soils have more clay in the control section.

Typical pedon of Boggy fine sandy loam in a pasture about 3 miles south and 2 miles west of Antlers; approximately 100 feet west and 2,000 feet south of northeast corner sec. 30, T. 4 S., R. 16 E.

A11—0 to 8 inches; very dark grayish brown (10YR 3/2) fine sandy loam; common fine faint yellowish brown and strong brown mottles; weak fine granular structure; very friable; common fine and medium roots inside peds; medium acid; clear smooth boundary.

A12—8 to 20 inches; dark grayish brown (10YR 4/2) fine sandy loam; common fine distinct gray and yellowish brown mottles; weak fine granular structure; very

friable; common fine and medium roots inside peds; medium acid; gradual smooth boundary.

C—20 to 60 inches; dark brown (10YR 4/3) fine sandy loam; common fine and medium distinct light gray (10YR 6/1) and strong brown (7.5YR 5/6) mottles; massive; very friable; common fine and medium roots in the upper part and few fine roots in the lower part; thin strata of loamy fine sand and loam; strongly acid.

Solum thickness ranges from 12 to 32 inches. Reaction is slightly acid or medium acid in the upper 20 inches and medium acid or strongly acid below.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. Mottles are in shades of brown or gray.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 1 to 3.

Bosville series

The Bosville series consists of deep, moderately well drained, very slowly permeable soils on uplands. These soils formed in material weathered from loamy and clayey sediments. They have a perched water table at a depth of 1 to 2 feet in winter and spring. Slopes are 3 to 12 percent.

Bosville soils are geographically closely associated with Bernow, Ruston, Glenpool, Hamden, Kullit, Larue, Romia, Saffell, Hollywood, and Swink soils. Bernow, Ruston, Hamden, Kullit, Larue, and Romia soils have less clayey control sections than Bosville soils. Glenpool soils have a more sandy control section. Saffell soils have a loamy-skeletal control section. Hollywood soils have montmorillonite clays in the control section, and Swink soils are shallow to bedrock.

Typical pedon of Bosville fine sandy loam in an area of Bosville fine sandy loam, 3 to 5 percent slopes; approximately 30 feet south and 2,640 feet west of northeast corner sec. 34, T. 4 S., R. 15 E.

A1—0 to 2 inches; brown (10YR 4/3) fine sandy loam; weak medium granular structure; friable; medium acid; clear smooth boundary.

A2—2 to 8 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium granular structure; friable; slightly acid; clear smooth boundary.

B21t—8 to 26 inches; red (2.5YR 4/6) clay; strong medium subangular blocky structure breaking to fine subangular blocky; firm; clay films on faces of peds; very strongly acid; gradual smooth boundary.

B22t—26 to 36 inches; red (2.5YR 4/6) clay; common, medium prominent light gray (10YR 6/1) and yellowish brown (10YR 5/4) mottles; strong medium subangular blocky structure breaking to fine subangular blocky; firm; clay films on faces of peds; very strongly acid; gradual smooth boundary.

B23t—36 to 44 inches; red (2.5YR 4/6) clay; common, medium prominent light gray (10YR 7/1) and yellowish brown (10YR 5/4) mottles; strong coarse blocky structure breaking to medium blocky; firm; clay films on faces of peds; very strongly acid; gradual smooth boundary.

B3—44 to 65 inches; red (2.5YR 4/6) clay; common, coarse and medium, prominent light gray (10YR 7/2) mottles; weak coarse blocky structure; firm; patchy clay films on faces of peds; strongly acid.

Solum thickness is more than 60 inches. Reaction is medium acid to strongly acid in the A horizon and strongly acid or very strongly acid in the B horizon.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 6, and chroma of 2 to 4.

The B21t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. The B22t, B23t, or B3 horizons have colors similar to those of the B21t horizon, or they are mottled in shades of brown, yellow, or gray.

Burwell series

The Burwell series consists of deep, moderately well drained, slowly permeable soils on uplands. These soils formed in material weathered from loamy sediments. They occur as circular or oblong mounds on the prairies. They are saturated for short periods in winter and in spring. Slopes are 0 to 5 percent.

Burwell soils are geographically closely associated with Moyers, Sobol, Tuskahoma, and Wister soils. The associated soils are more clayey in the control section than Burwell soils.

Typical pedon of Burwell loam in an area of Moyers-Burwell complex, 3 to 5 percent slopes, 2 miles south of Miller; approximately 600 feet south and 50 feet east of northwest corner sec. 21, T. 3 S., R. 15 E.

A1—0 to 23 inches; very dark grayish brown (10YR 3/2) loam; moderate, medium and fine granular structure; friable; many roots of all sizes; many worm casts; medium acid; gradual smooth boundary.

A2—23 to 28 inches; brown (10YR 5/3) loam; few fine distinct light gray mottles; moderate, medium, and fine granular structure; friable; many roots of all sizes; many worm casts; few krotovinas; medium acid; gradual wavy boundary.

B21t—28 to 36 inches; yellowish brown (10YR 5/4) clay loam; common fine and medium distinct strong brown (7.5YR 5/8), light gray (10YR 6/1), yellowish red (5YR 4/8) and red (2.5YR 4/8) mottles; moderate fine and medium subangular blocky structure; firm; many roots of all sizes; few worm casts; common black concretions; common fragments of sandstone less than 75 mm in diameter; clay films on faces of peds; medium acid; gradual smooth boundary.

B22t—36 to 48 inches; yellowish brown (10YR 5/4) clay loam; common medium distinct strong brown (7.5YR 5/8) yellowish red (5YR 4/8), red (2.5YR 4/8), olive brown (2.5Y 4/4), light olive brown (2.5Y 5/4) and light gray (10YR 6/1) mottles; moderate medium subangular blocky structure; firm; common roots of all sizes; common black concretions; common fragments of sandstone less than 75 mm in diameter; clay films on faces of peds; medium acid; gradual smooth boundary.

B23t—48 to 65 inches; mottled red (2.5YR 4/8), light gray (10YR 6/1), light brownish gray (10YR 6/2), yellowish red (5YR 5/6) and strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; firm; few roots of all sizes; common black concretions, common fragments of sandstone less than 75 mm in diameter; clay films on faces of peds; medium acid.

Solum thickness is more than 60 inches. The A1 horizon has hue of 10YR, value of 3, and chroma of 2 or 3. Texture is loam, silt loam, or very fine sandy loam. Reaction is medium acid or strongly acid. The A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Texture and reaction are similar to those in the A1 horizon.

The B1 horizon, where present, has hue of 10YR or 7.5YR, value of 5, and chroma of 3 to 8. Texture is clay loam or silty clay loam. Reaction is medium acid or strongly acid. The B21t horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. Mottles are present in shades of gray, red, or brown in most pedons. Texture is clay loam or silty clay loam. Reaction ranges from medium acid to neutral. Fragments of sandstone 2 to 75 mm in diameter make up 0 to 5 percent of the volume. The B22t horizon has hue 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. Mottles are similar to those in the B21t horizon. Texture is clay loam or clay. Reaction ranges from mildly alkaline to medium acid. Fragments of sandstone from 2 to 75 mm in diameter make up 0 to 10 percent of the volume. The B23t horizon is coarsely mottled in shades of red, gray, or brown. Some pedons have hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. Texture is clay loam or clay. Reaction ranges from moderately alkaline to medium acid. Fragments of sandstone or shale from 2 to 75 mm in diameter make up 0 to 20 percent of the volume.

Carnasaw series

The Carnasaw series consists of deep, well drained, slowly permeable soils on uplands. These soils formed in material weathered from shales and sandstone that occur in thin tilted interlaminations. Slopes are 8 to 20 percent.

Carnasaw soils are geographically closely associated with Pirum, Clebit, and Stapp soils. Pirum soils have less clay in the control section than Carnasaw soils. Clebit soils are shallow over sandstone. Stapp soils have grayish mottles closer to the surface.

Typical pedon of Carnasaw stony fine sandy loam in an area of Carnasaw-Pirum-Clebit association, dry, moderately steep, about 4 miles north of Jumbo on pipeline right-of-way; approximately 3,400 feet south and 600 feet west of northeast corner sec. 4, T. 1 S., R. 15 E.

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) stony fine sandy loam; weak medium and fine granular structure; friable; many fine roots; strongly acid; clear smooth boundary.

A2—3 to 7 inches; brown (10YR 5/3) stony fine sandy loam; weak fine granular structure; friable; many fine roots; strongly acid; clear smooth boundary.

B21t—7 to 24 inches; red (2.5YR 4/6) clay; moderate fine blocky structure; very firm; few fine roots; clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t—24 to 35 inches; red (2.5YR 4/6) clay; moderate fine blocky structure; very firm; clay films on faces of peds; very strongly acid; gradual smooth boundary.

B3—35 to 42 inches; red (2.5YR 4/6) clay; few fine distinct gray mottles; moderate fine blocky structure; very firm; patchy clay films on faces of peds; few fragments of shale; very strongly acid; clear irregular boundary.

Cr—42 to 46 inches; gray fractured shale bedrock laminated with thin layers of sandstone, tilted 40 degrees from horizontal.

Solum thickness is 30 to 60 inches. Because of the underlying tilted bedrock, solum thickness varies within short linear distances. The A1 horizon has hue of 10YR or 7.5YR, value of 2 to 5, and chroma of 2 or 3. Stones make up 5 to 20 percent of the volume. Reaction ranges from medium acid to extremely acid. The A2 horizon has hue of 10YR or 7.5YR, value of 4 to 6 and chroma of 3 to 8. Reaction is similar to that of the A1 horizon.

The B2t horizon has hue of 2.5YR, 5YR, or 7.5YR, value of 4 to 6, and chroma of 6 to 8. The lower part is mottled in shades of brown or gray in some areas. Texture is clay, silty clay, clay loam, or silty clay loam. Fragments of sandstone or shale make up 0 to 10 percent of the volume. Reaction ranges from strongly acid to extremely acid. The B3 horizon is similar in color, texture, and reaction to the B2t horizon. Also, it includes more mottles and fragments of sandstone or shale than the B2t horizon.

Ceda series

The Ceda series consists of deep, well drained, rapidly permeable soils. These are on flood plains of narrow drainageways in the mountains. They formed in material weathered from loamy sediments that contain fragments of sandstone or chert. Slopes are 0 to 3 percent.

Ceda soils are geographically closely associated with Rubble land. Rubble land consists of stones, boulders, and gravel.

Typical pedon of Ceda gravelly fine sandy loam in an area of Ceda-Rubble land complex; approximately 2,300 feet south and 50 feet west of northeast corner sec. 13, T. 2 S., R. 21 E.

A1—0 to 12 inches; dark grayish brown (10YR 4/2) gravelly fine sandy loam; weak fine granular structure; friable; many fine roots; about 30 percent by volume sandstone gravel, a few cobbles; medium acid; clear smooth boundary.

C1—12 to 32 inches; yellowish brown (10YR 5/4) gravelly fine sandy loam; massive; friable; common fine roots; about 40 percent by volume sandstone gravel, a few cobbles; medium acid; gradual smooth boundary.

C2—32 to 65 inches; yellowish brown (10YR 5/4) gravelly fine sandy loam; massive; friable; about 40 percent gravel by volume in upper part and about 60 percent gravel in the lower part, a few cobbles; medium acid.

The soil is slightly acid or medium acid throughout the A and C horizons. The A1 horizon has hue of 10YR, value of 2 to 5, and chroma of 2 or 3. Texture is gravelly fine sandy loam or cherty silt loam. Coarse fragments make up 15 to 50 percent of the volume.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6. Texture is gravelly fine sandy loam, gravelly loam, gravelly silt loam, gravelly clay loam, cherty silt loam, cherty clay loam, or very cherty silt loam. Coarse fragments make up 35 to 85 percent of the volume.

Ceda soils in map units 15 and 16 are taxadjuncts to the series. They have a thicker A horizon than typical for the Ceda series, and the coarse fragments are angular instead of round. These differences do not affect the use and management of the soils.

Clebit series

The Clebit series consists of shallow, well drained, moderately rapidly permeable soils on uplands. These soils formed in material weathered from sandstone. They are on ridge crests and convex side slopes of the mountains. Slopes are generally 8 to 45 percent.

Clebit soils are geographically closely associated with Carnasaw, Pirum, and Stapp soils. The associated soils have a thicker solum. Carnasaw and Stapp soils also have a clayey control section.

Typical pedon of Clebit stony very fine sandy loam in an area of Carnasaw-Pirum-Clebit association, dry, moderately steep, about 4 miles north of Jumbo on the pipeline right-of-way; approximately 2,400 feet south and 900 feet east of northwest corner sec. 3, T. 1 S., R. 15 E.

A1—0 to 5 inches; very dark grayish brown (10YR 3/2) stony very fine sandy loam; weak fine granular structure; friable; many fine roots; about 45 percent by volume sandstone fragments; medium acid; clear smooth boundary.

B2—5 to 12 inches; brown (10YR 5/3) stony very fine sandy loam; moderate medium and fine granular structure; friable; common fine roots; about 45 percent by volume sandstone fragments; slightly acid; clear irregular boundary.

R—12 to 15 inches; hard sandstone, tilted 40 degrees from horizontal.

Solum thickness ranges from 10 to 20 inches. Reaction ranges from slightly acid to very strongly acid throughout the solum.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. Texture is stony very fine sandy loam, stony fine sandy loam, or very gravelly fine sandy loam. Fragments of sandstone 2 to 75 mm in diameter make up 25 to 50 percent of the volume, and those more than 75 mm in diameter make up 0 to 20 percent of the volume.

The B2 horizon has hue of 10YR or 7.5YR, value of 3 to 6, and chroma of 2 to 6. Texture is stony fine sandy loam, stony very fine sandy loam, the gravelly or very gravelly counterpart of fine sandy loam, or very fine sandy loam or loam. Fragments of sandstone 2 to 75 mm in diameter make up 25 to 50 percent of the volume, and those more than 75 mm in diameter make up 5 to 25 percent of the volume.

The R layer is hard sandstone that is massive, fractured, and tilted 20 to 90 degrees from horizontal.

Dela series

The Dela series consists of deep, moderately well drained, moderately rapidly permeable soils on flood plains. These soils formed in material weathered from loamy and sandy sediments. The water table is at a depth of 3 to 5 feet in winter and in spring. Slopes are 0 to 3 percent.

Dela soils are geographically closely associated with Pushmataha, Elysian, Guyton, Speer, and Rexor soils. Pushmataha, Guyton, and Rexor soils have a more silty control section than Dela soils. Speer soils are more clayey in the control section. Elysian soils have an argillic horizon and occur on mounds. Guyton and Rexor soils are more clayey, and Guyton, Speer, and Rexor soils have an argillic horizon.

Typical pedon of Dela fine sandy loam in an area of Dela fine sandy loam, occasionally flooded, about 8 miles southeast of Antlers; approximately 1,360 feet west and 200 feet north of southeast corner sec. 14, T. 4 S., R. 17 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) fine sandy loam; moderate medium granular structure; friable; slightly acid; clear smooth boundary.

A1—6 to 12 inches; brown (10YR 4/3) fine sandy loam; moderate medium granular structure; friable; slightly acid; clear smooth boundary.

C1—12 to 22 inches; yellowish brown (10YR 5/4) fine sandy loam; massive; friable; thin strata of brown (10YR 4/3) fine sandy loam; slightly acid; clear smooth boundary.

C2—22 to 36 inches; light yellowish brown (10YR 6/4) fine sandy loam; few medium distinct dark brown (7.5YR 3/4) mottles; massive; friable; thin strata of pale brown (10YR 6/3) fine sandy loam; slightly acid; clear smooth boundary.

C3—36 to 55 inches; pale brown (10YR 6/3) loamy fine sand; few medium faint grayish brown (10YR 5/2) mottles; massive; friable; thin strata of brown (7.5YR 5/4) fine sandy loam; medium acid; clear smooth boundary.

C4—55 to 72 inches; very pale brown (10YR 7/3) loamy fine sand; common medium distinct dark brown (10YR 3/3) and few medium distinct grayish brown (10YR 5/2) mottles; massive; friable; thin strata of brownish yellow (10YR 6/6) fine sandy loam; medium acid.

Reaction is slightly acid or neutral in the A and C horizons. Mottles occur at depths of 24 to 48 inches. The A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The C horizon has hue of 10YR and 7.5YR, value of 4 to 7, and chroma of 3 to 6. Texture in the upper 36 inches is fine sandy loam, sandy loam, or loam. Below 36 inches it is fine sandy loam, sandy loam, or loamy fine sand.

Elysian series

The Elysian series consists of deep, moderately well drained, moderately permeable soils on terraces. These soils formed in material weathered from loamy sediments. They are circular or oblong mounds 2 to 5 feet high and 40 to 100 feet in diameter. The water table is at a depth of 3 to 6 feet in winter and in spring. Slopes are 0 to 5 percent.

Elysian soils are geographically closely associated with Dela, Pushmataha, Wrightsville, Guyton, and Speer soils. Dela and Pushmataha soils do not have argillic horizons; in addition, Pushmataha soils have a coarse-silty control section. Wrightsville soils have a fine control section. Guyton soils have a fine-silty control section. Speer soils have a fine-loamy control section.

Typical pedon of Elysian very fine sandy loam in an area of Guyton-Elysian complex, undulating, about one-half mile west of Tuskahoma; approximately 2,000 feet south and 50 feet east of northwest corner sec. 26, T. 2 N., R. 19 E.

A1—0 to 7 inches; yellowish brown (10YR 5/4) very fine sandy loam; weak medium and fine granular structure; friable; many fine roots; medium acid; gradual smooth boundary.

B1—7 to 18 inches; yellowish brown (10YR 5/6) very fine sandy loam; weak medium and fine granular structure; friable; common fine roots; medium acid; clear wavy boundary.

B&A'2—18 to 40 inches; the B part is dark brown (7.5YR 4/4) loam; few medium and fine distinct light gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; patchy clay films on peds; strongly acid. The A'2 part is tongues, 1 to 3 cm wide, of very pale brown (10YR 7/3) very fine sandy loam that extend through the horizon and make up about 15 percent of the volume; strongly acid; abrupt smooth boundary.

IIB22tg—40 to 60 inches; gray (10YR 5/1) silty clay loam; common medium and coarse faint light brownish gray (10YR 6/2) mottles; moderate medium blocky structure; firm; clay films on faces of peds; strongly acid.

Solum thickness is more than 60 inches. The A1 horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 2 to 4. Texture is very fine sandy loam or fine sandy loam. Reaction ranges from slightly acid to strongly acid.

The B1 horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 3 to 6. Texture is very fine sandy loam or fine sandy loam. Reaction ranges from slightly acid to strongly acid.

The B part of the B&A'2 horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. Mottles in shades of brown are in some areas. Texture is loam or sandy clay loam. Reaction ranges from medium acid to very strongly acid. The A part consists of tongues or interfingers that make up 5 to 30 percent of the volume of B2t horizon. It has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 1 to 4. Texture is very fine sandy loam or fine sandy loam. Reaction is strongly acid or very strongly acid.

The IIB2tg horizon, where present, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. Texture is clay, silty clay, silty clay loam, or clay loam. Reaction ranges from slightly acid to very strongly acid.

The Elysian soils in Pushmataha County are taxadjuncts to the Elysian series. They have a lithologic discontinuity at a depth of about 40 inches. This difference does not affect the use or management of the soils.

Glenpool series

The Glenpool series consists of deep, somewhat excessively drained, rapidly permeable soils on uplands. These soils formed in sandy material of the Coastal Plain. Many areas are on high points on the landscape. Slopes are 0 to 12 percent.

Glenpool soils are geographically closely associated with Bernow, Bosville, and Ruston soils. The associated soils have a more clayey control section than Glenpool soils.

Typical pedon of Glenpool loamy fine sand in an area of Glenpool loamy fine sand, 0 to 3 percent slopes, about 4 miles west of Antlers; approximately 2,000 feet east and 100 feet south of northwest corner sec. 11, T. 4 S., R. 15 E.

A1—0 to 11 inches; brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable; many fine roots; medium acid; clear smooth boundary.

A2—11 to 46 inches; brown (7.5YR 5/4) loamy fine sand; weak fine granular structure; very friable; medium acid; gradual smooth boundary.

B21t—46 to 60 inches; strong brown (7.5YR 5/6) loamy fine sand; weak medium prismatic structure; very friable; clay films bridging sand grains; medium acid; clear wavy boundary.

A&B—60 to 80 inches; alternating layers, lamellae of A and B horizons; the A part (A2) is yellowish red (5YR 5/6) loamy fine sand; single grained; very friable; strongly acid. The B part (B2t) is red (2.5YR 4/6) fine sandy loam; weak fine subangular blocky structure; very friable; wavy and discontinuous; one-fourth to one-half inch thick and 3 to 12 inches apart; clay bridges sand grains; strongly acid. Few spots and pockets of clean sand grains.

Solum thickness is more than 60 inches. Reaction is medium acid or strongly acid in all horizons.

The A1 horizon has hue of 10YR or 7.5YR, value of 3 to 6, and chroma of 2 to 4. The A2 horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 2 to 6. Texture is loamy fine sand or fine sand.

The B21t horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 6.

The A part (A2) of the A&B horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 to 8. The B part (B2t) of the A&B horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. Texture is fine sandy loam or loamy fine sand. These lamellae (alternating layers) are as thick as 1 inch and are 3 to 12 inches apart.

Guyton series

The Guyton series consists of deep, poorly drained, very slowly permeable soils on terraces. These soils formed in material weathered from loamy sediments. They are saturated in winter and in spring and during other seasons of high rainfall. Slopes are 0 to 1 percent.

Guyton soils are geographically closely associated with Dela, Pushmataha, Rexor, Elysian, and Speer soils. Dela and Elysian soils have a coarse-loamy control section, and Pushmataha soils have a coarse-silty control section. Rexor soils are well drained, whereas Guyton soils are poorly drained. Speer soils have a fine-loamy control section.

Typical pedon of Guyton silt loam in an area of Guyton-Elysian complex, undulating, about one-half mile west of Tuskahoma along railroad right-of-way; approximately 1,500 feet south and 50 feet east of northwest corner sec. 26, T. 2 N., R. 19 E.

A1—0 to 3 inches; grayish brown (10YR 5/2) silt loam; common fine distinct light gray and yellowish brown mottles; weak fine granular structure; friable; strongly acid; clear smooth boundary.

A2g—3 to 6 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak fine granular structure; friable; strongly acid; abrupt irregular boundary.

B&A—6 to 16 inches; the B part is gray (10YR 5/1) silty clay loam; common medium and coarse distinct yellowish brown (10YR 5/4), pale brown (10YR 6/3) and light gray (10YR 6/1) mottles; moderate medium blocky structure; firm; discontinuous clay films on faces of peds; very strongly acid. The A part is tongues of light gray (10YR 7/2) silt loam throughout the B part; very strongly acid; gradual wavy boundary.

B21tg—16 to 27 inches; gray (10YR 5/1) silty clay loam; common medium and coarse faint light brownish gray (10YR 6/2) mottles; moderate medium blocky structure; firm; thin clay films on faces of peds; strongly acid; gradual smooth boundary.

B22tg—27 to 44 inches; gray (10YR 5/1) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse blocky structure; moderately alkaline; gradual smooth boundary.

B3g—44 to 70 inches; gray (10YR 5/1) silty clay loam; many medium and coarse distinct dark yellowish brown (10YR 4/4) mottles; weak coarse blocky structure; firm; moderately alkaline.

Solum thickness is more than 60 inches. The A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Reaction ranges from medium acid to very strongly acid. The A2g horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Mottles are in shades of brown, and texture is silt loam or very fine sandy loam. Reaction ranges from medium to very strongly acid.

The B part of the B&A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 1 or 2. Mottles are in shades of gray or brown. The A part has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Reaction through-

out this horizon ranges from medium acid to very strongly acid.

The B21tg and B3g horizons have hue of 7.5YR, 10YR, or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Mottles are in shades of brown or gray. Texture is silty clay loam, silt loam, or clay loam. Reaction ranges from moderately alkaline to very strongly acid. The B22tg horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Mottles are in shades of brown or gray. Texture is silty clay loam, silt loam, or clay loam.

The Guyton soils in Pushmataha County are taxadjuncts to the Guyton series. They have a thinner A horizon, and the B2tg horizon is moderately alkaline. These differences do not affect the use and management of the soils.

Hamden series

The Hamden series consists of deep, moderately well drained, moderately slowly permeable soils on uplands. These soils formed in material weathered from interbedded sandstone and clay material of the Coastal Plain. The water table is at a depth of 1/2 to 1 1/2 feet in winter and in spring. Slopes are 0 to 2 percent.

Hamden soils are geographically closely associated with Bernow, Bosville, and Romia soils. Bernow and Romia soils are well drained. Bosville soils have a clayey control section.

Typical pedon of Hamden fine sandy loam in an area of Hamden fine sandy loam, 0 to 2 percent slopes, about 1 mile south and 1 1/2 miles west of Rattan; approximately 1,585 feet south and 2,750 feet east of northwest corner sec. 29, T. 4 S., R. 18 E.

Ap—0 to 5 inches; grayish brown (10YR 5/2) fine sandy loam; common fine and medium faint dark yellowish brown (10YR 4/4) mottles; weak fine and medium granular structure; very friable; many roots of all sizes; strongly acid; clear smooth boundary.

B21t—5 to 16 inches; brown (10YR 5/3) loam; many fine faint yellowish brown and many fine distinct light brownish gray mottles; moderate fine subangular blocky structure; friable; many roots of all sizes; clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t—16 to 30 inches; yellowish brown (10YR 5/4) loam; many fine distinct light gray mottles; moderate medium subangular blocky structure; friable; common roots of all sizes; clay films on faces of peds; strongly acid; gradual smooth boundary.

B23t—30 to 48 inches; light gray (10YR 6/1) sandy clay; many fine and medium distinct yellowish brown (10YR 5/4) and red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; common roots of all sizes; clay films on faces of peds; few pockets of clean sand grains; few black concretions; strongly acid; gradual smooth boundary.

B24t—48 to 72 inches; light gray (10YR 6/1) sandy clay; many coarse distinct yellowish brown (10YR 5/4) and red (2.5YR 4/6) mottles; weak medium subangular blocky structure; firm; few roots of all sizes; patchy clay films on faces of peds; few pockets of clean sand grains; few black concretions; strongly acid.

Solum thickness is more than 60 inches. The A1 or Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. Reaction is medium acid or strongly acid. The A2 horizon, where present, has hue of 10YR, value of 5 to 7, and chroma of 2 or 3. Mottles are in shades of brown or gray. Reaction is medium acid or strongly acid.

The B21t and B22t horizons have hue of 10YR, value of 5 to 7, and chroma of 2 to 6. Mottles are in shades of brown, gray, or red. Reaction is medium acid or strongly acid. The B23t and B24t horizons have hue of 10YR, value of 5 to 7, and chroma of 1. Mottles are in shades of brown, red, or gray.

Hollywood series

The Hollywood series consists of deep, moderately well drained, very slowly permeable soils on uplands. These soils formed in material weathered from interbedded shale and limestone. Slopes are 2 to 6 percent.

Hollywood soils are geographically closely associated with Swink and Bosville soils. Swink soils are shallow and skeletal. Bosville soils have an argillic horizon.

Typical pedon of Hollywood clay loam in an area of Hollywood-Swink complex, 2 to 8 percent slopes, about 4 miles south and 6 miles west of Antlers; approximately 2,900 feet south and 50 feet east of northwest corner sec. 34, T. 4 S., R. 15 E.

A11—0 to 18 inches; very dark gray (10YR 3/1) clay loam; moderate medium blocky structure breaking to moderate coarse and medium granular structure; firm; many limestone fragments up to one-half inch in diameter; calcareous; moderately alkaline; gradual smooth boundary.

A12—18 to 24 inches; very dark gray (10YR 3/1) clay; moderate coarse blocky structure breaking to strong medium granular; firm; pressure faces on surfaces of some peds; many limestone fragments up to one-half inch in diameter; few black concretions; calcareous; moderately alkaline; gradual wavy boundary.

AC—24 to 30 inches; olive brown (2.5Y 4/4) clay; weak coarse blocky structure; very firm; common intersecting slickensides that form parallelepipeds; pressure faces on some peds; many limestone fragments; few black concretions; calcareous; moderately alkaline; gradual smooth boundary.

AC1ca—30 to 40 inches; light olive brown (2.5Y 5/4) clay; few medium distinct light yellowish brown (10YR 6/4) mottles; weak coarse blocky structure; common intersecting slickensides that form paralle-

lepipeds; extremely firm; pressure faces on most peds; common calcium carbonate concretions; calcareous; moderately alkaline; gradual smooth boundary.

AC2ca—40 to 60 inches; light olive brown (2.5Y 5/4) clay; few to common medium distinct light yellowish brown (10YR 6/4) and reddish brown (5YR 5/4) mottles; common intersecting slickensides that form parallelepipeds; weak coarse blocky structure; extremely firm; pressure faces on most peds; many calcium carbonate concretions; calcareous; moderately alkaline.

Solum thickness is more than 60 inches. The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1. Texture is clay loam in the upper part and silty clay or clay in the lower part. Reaction is slightly acid to moderately alkaline in the upper part and mildly or moderately alkaline in the lower part. The AC horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 2 to 4. Mottles, where present, are in shades of gray or brown. Soft powdery masses of calcium carbonate make up 2 to 20 percent of the volume.

Honobia series

The Honobia series consists of moderately deep, well drained, slowly permeable soils on uplands. These soils formed in material weathered from shale. They occur in long narrow areas in the Ouachita Mountains. Slopes are 8 to 12 percent.

Honobia soils are geographically closely associated with Nashoba, Tuskahoma, Clebit, and Sobol soils. Clebit and Tuskahoma soils have a shallow solum over bedrock. Nashoba soils are less clayey in the control section than Honobia soils. Sobol soils are not skeletal in the control section.

Typical pedon of Honobia stony fine sandy loam in an area of Honobia-Nashoba association strongly sloping, about 5 miles west of Honobia; approximately 700 feet west and 900 feet south of northeast corner sec. 32, T. 1 N., R. 22 E.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) stony fine sandy loam; weak fine and medium granular structure; very friable; many roots of all sizes; flat fragments of sandstone and shale less than 75 mm in diameter make up 25 percent of the volume; common stones; slightly acid; clear smooth boundary.

A2—4 to 8 inches; strong brown (7.5YR 5/6) stony fine sandy loam; weak fine and medium granular structure; very friable; many roots of all sizes; flat fragments of sandstone and shale less than 75 mm in diameter make up 25 percent of the volume; common stones; medium acid; clear wavy boundary.

B21t—8 to 16 inches; yellowish red (5YR 5/6) clay loam; moderate fine and medium subangular blocky structure; firm; common roots of all sizes; clay films on faces of peds; flat fragments of shale and sandstone less than 75 mm in diameter make up 40 percent of the volume; strongly acid; gradual smooth boundary.

B22t—16 to 26 inches; yellowish red (5YR 5/6) clay; common coarse distinct strong brown (7.5YR 5/6) yellowish brown (10YR 5/6) and red (2.5YR 4/6) mottles; strong medium blocky structure; very firm; common roots of all sizes; clay films on faces of peds; flat fragments of sandstone and shale less than 75 mm in diameter make up 40 percent of the volume; very strongly acid; gradual smooth boundary.

B23t—26 to 36 inches; yellowish red (5YR 5/6) clay; common coarse distinct strong brown (7.5YR 5/6), yellowish brown (10YR 5/6) and red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; very firm; few roots of all sizes; patchy clay films on faces of peds; flat fragments of sandstone and shale less than 75 mm in diameter make up 50 percent of the volume; very strongly acid; gradual irregular boundary.

Cr—36 to 40 inches; olive shale, tilted 40 degrees from horizontal.

Solum thickness and depth to bedrock range from 20 to 40 inches. Reaction ranges from slightly acid to strongly acid in the A horizons and from medium acid to very strongly acid in the B2t horizons.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3. Flat fragments of sandstone or shale from 2 to 75 mm in diameter make up 20 to 40 percent of the volume and from 75 mm to 60 cm in diameter make up 0 to 20 percent of the volume. The A2 horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. Texture is loam or fine sandy loam. Flat fragments of sandstone or shale from 2 to 75 mm in diameter make up 20 to 40 percent of the volume and from 75 mm to 60 cm in diameter make up 0 to 20 percent of the volume.

The B21t horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 4 to 8. Texture is clay loam or clay. The clay content is 35 to 45 percent. Flat fragments of sandstone or shale from 2 to 75 mm in diameter make up 35 to 50 percent of the volume. The B22t and B23t horizons have hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. Mottles are in shades of red or brown. Flat fragments of sandstone or shale from 2 mm to 75 mm in diameter make up 35 to 70 percent of the volume.

The Cr horizon is olive or gray fractured shale that is tilted 20 to 90 degrees from horizontal.

Kullit series

The Kullit series consists of deep, moderately well drained, moderately slowly permeable soils on uplands. These soils formed in material weathered from unconsolidated stratified loamy sediments. They are saturated for short periods in winter and in spring. Slopes are 0 to 2 percent.

Kullit soils are geographically closely associated with Bernow, Bosville, Romia, and Ruston soils. Bernow, Romia, and Ruston soils are well drained. Bosville soils are more clayey in the control section than Kullit soils.

Typical pedon of Kullit fine sandy loam in an area of Kullit fine sandy loam, 1 to 2 percent slopes, about 2 miles west and 1 1/4 miles south of Rattan; approximately 2,100 feet east and 1,700 feet south of northwest corner sec. 29, T. 4 S., R. 18 E.

Ap—0 to 5 inches; grayish brown (10YR 5/2) fine sandy loam; common fine and medium faint dark yellowish brown (10YR 4/4) mottles; moderate medium and fine granular structure; friable; strongly acid; clear smooth boundary.

A2—5 to 16 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable; strongly acid; clear wavy boundary.

B21t—16 to 30 inches; yellowish brown (10YR 5/4) sandy clay loam; many medium distinct light gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; strongly acid; gradual smooth boundary.

B22t—30 to 48 inches; yellowish red (5YR 5/6) sandy clay loam; many coarse prominent light gray (10YR 6/1) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; clay films on faces of peds; strongly acid; gradual wavy boundary.

B23t—48 to 72 inches; light gray (10YR 6/1) clay; many medium and coarse distinct yellowish brown (10YR 5/6) and prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; firm; strongly acid.

Solum thickness is more than 60 inches. Reaction is slightly acid to strongly acid in the A horizon and strongly acid or very strongly acid in the B2t horizon.

The Ap or A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 to 6.

The B21t and B22t horizons have hue of 5YR, 7.5YR, or 10YR, value of 4 to 6, and chroma of 4 to 8. Mottles are in shades of gray or brown. Texture is sandy clay loam, loam, or clay loam. The remaining B2t horizons have hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Mottles are in shades of brown or red. Texture is clay or sandy clay.

Larue series

The Larue series consists of deep, well drained, moderately permeable soils on uplands. These soils formed in material weathered from unconsolidated loamy and sandy sediments. Slopes are 0 to 8 percent.

Larue soils are geographically closely associated with Bosville and Saffell soils. Bosville soils have a more clayey control section, and Saffell soils have a loamy-skeletal control section.

Typical pedon of Larue loamy fine sand in an area of Larue loamy fine sand, 0 to 3 percent slopes; approximately 1,480 feet east and 50 feet north of southwest corner sec. 19, T. 4 S., R. 15 E.

A1—0 to 6 inches; brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable; medium acid; clear smooth boundary.

A2—6 to 28 inches; pale brown (10YR 6/3) loamy fine sand; weak fine granular structure; very friable; strongly acid; clear wavy boundary.

B21t—28 to 40 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium prismatic structure; friable; clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t&A'2—40 to 72 inches; the B22t part is yellowish red (5YR 5/6) sandy clay loam; many medium prominent red (2.5YR 4/8) mottles; moderate coarse prismatic structure; friable; clay films on surfaces of peds; strongly acid. The A'2 part is vertical streaks throughout the B part; it is light brownish gray (10YR 6/2) sandy loam; massive; friable; strongly acid.

Solum thickness is more than 60 inches. The A1 or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Reaction is slightly acid or medium acid. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Reaction ranges from slightly acid to strongly acid.

The B21t horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. Reaction ranges from slightly acid to strongly acid. The B22t part of the B22t&A'2 horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8 or is coarsely mottled in shades of red, brown, yellow, or gray. Reaction is strongly acid to very strongly acid. The A'2 part of the B22t&A'2 horizon makes up 5 to 15 percent of the horizon matrix. It has hue of 10YR, value of 6 or 7, and chroma of 1 or 2. Reaction is strongly acid to very strongly acid.

Moyers series

The Moyers series consists of deep, moderately well drained, slowly permeable soils on uplands. These soils formed in material weathered from shale. They occur in the valleys of the Ouachita Mountains. They have a water table at a depth of 1 to 2 feet in winter and in spring. Slopes are 1 to 5 percent.

Moyers soils are geographically closely associated with Burwell and Wister soils. Burwell soils have a fine-silty control section. Wister soils have clay nearer the surface than Moyers soils and are very slowly permeable.

Typical pedon of Moyers loam in an area of Moyers-Burwell complex, 3 to 5 percent slopes, about 1 mile west and one-half mile south of Moyers; approximately 1,600 feet south and 1,000 feet west of northeast corner sec. 12, T. 3 S., R. 15 E.

A1—0 to 9 inches; very dark grayish brown (10YR 3/2) loam; weak fine and medium granular structure; friable; many roots of all sizes; slightly acid; clear smooth boundary.

B1—9 to 15 inches; brown (10YR 5/3) loam; common fine distinct strong brown mottles; weak fine and medium granular structure; friable; many roots of all sizes; slightly acid; clear smooth boundary.

B21t—15 to 24 inches; yellowish brown (10YR 5/4) clay loam; common fine distinct strong brown and light gray mottles; weak fine and medium subangular blocky structure; firm; few fine roots; few black concretions; clay films on faces of peds; medium acid; gradual smooth boundary.

B22t—24 to 44 inches; light yellowish brown (10YR 6/4) clay; many fine and medium distinct strong brown (7.5YR 5/8), yellowish red (5YR 5/8), red (2.5YR 4/8) and light gray (10YR 7/2) mottles; weak coarse blocky structure breaking to weak fine and medium subangular blocky; firm; few fine roots; common black concretions; clay films on faces of peds; strongly acid; clear smooth boundary.

Cr—44 to 50 inches; olive (5Y 5/4) slightly weathered shale.

Solum thickness and depth to bedrock range from 40 to 60 inches. The A1 horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 4. Texture is loam, silt loam, or very fine sandy loam. Reaction is slightly acid or medium acid.

The B1 horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. Mottles in shades of brown are present in some pedons. Texture is loam, clay loam, or silty clay loam. Reaction ranges from slightly acid to very strongly acid. The B21t horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. Mottles are in shades of brown, red, or gray. Texture is clay loam or silty clay loam that is 35 to 40 percent clay. Reaction ranges from slightly acid to very strongly acid. The B22t horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 4 to 6. Mottles are in shades of brown, red or gray. Texture is clay loam or clay. Reaction ranges from neutral to strongly acid. A B23t or B3 horizon is present in some areas.

The Cr horizon is olive or gray shale. Reaction ranges from moderately alkaline to strongly acid.

Nahatche variant

The Nahatche variant consists of deep, poorly drained, very slowly permeable soils on flood plains. These soils formed in material weathered from clayey and loamy sediments. They are saturated in winter and in spring and during other seasons of high rainfall. Slopes are 0 to 1 percent. The soils of the Nahatche variant have a heavier subsoil and are slightly cooler and wetter than those of the Nahatche series.

Nahatche variant soils are geographically closely associated with Boggy soils. Boggy soils have a more sandy control section.

Typical pedon of Nahatche Variant sandy loam; approximately 1,500 feet east and 2,400 feet north of southwest corner sec. 9, T. 4 S., R. 16 E.

A1—0 to 10 inches; pale brown (10YR 6/3) sandy loam; common fine faint light gray mottles; weak medium and fine granular structure; friable; strongly acid; clear smooth boundary.

C1g—10 to 30 inches; dark grayish brown (10YR 4/2) clay loam; common fine faint light gray mottles; moderate fine and medium granular structure; friable; strongly acid; clear smooth boundary.

C2g—30 to 55 inches; grayish brown (10YR 5/2) clay loam; few fine faint light gray mottles; weak to moderate medium blocky structure breaking to granular; friable; strongly acid; clear smooth boundary.

Abg—55 to 80 inches; dark gray (10YR 4/1) clay, few fine distinct light gray and dark grayish brown mottles; weak coarse blocky structure; firm; slightly acid.

The A1 horizon has hue of 10YR, value of 3 to 6, and chroma of 1 to 3.

The Cg and Abg horizons have hue of 10YR, value of 4 or 5, and chroma of 1 or 2.

Nashoba series

The Nashoba series consists of moderately deep, well drained, moderately rapidly permeable soils on uplands. These soils formed in material weathered from sandstone. They are on strongly sloping sides of the Ouachita Mountains. Slopes are 8 to 12 percent.

Nashoba soils are geographically closely associated with Honobia, Tuskahoma, Clebit, and Sobol soils. Honobia and Sobol soils have a more clayey control section than Nashoba soils. Tuskahoma and Clebit soils have a solum less than 20 inches thick.

Typical pedon of Nashoba stony sandy loam in an area of Honobia-Nashoba association, strongly sloping, about 12 miles northeast of Finley along One Creek Road; approximately 1,700 feet west and 550 feet south of northeast corner sec. 10, T. 2 S., R. 19 E.

A1—0 to 4 inches; grayish brown (10YR 5/2) stony sandy loam; weak medium granular structure; very

friable; many roots of all sizes; 10 percent stones by volume and 15 percent flat fragments of sandstone by volume; medium acid; clear smooth boundary.

B21—4 to 30 inches; brown (10YR 5/3) stony sandy loam; weak medium granular structure; friable; many roots of all sizes; 15 percent stones by volume and 35 percent flat fragments of sandstone by volume; strongly acid; abrupt irregular boundary.

C&B22—30 to 40 inches; the C part, about 90 percent of the horizon, is yellowish brown (10YR 5/6) and pale brown (10YR 6/3) fine-grained weathered sandstone bedrock that is tilted 40 degrees from horizontal; the remaining 10 percent is the B22 part, which consists of sandy loam in the fractures between the tilted sandstone; weak fine granular structure; friable; very strongly acid; abrupt irregular boundary.

R—40 to 50 inches; yellowish brown (10YR 5/6) fine grained sandtone bedrock, tilted 40 degrees from horizontal.

Solum thickness ranges from 20 to 40 inches. Because of the irregular boundary between the B2 horizon and the underlying tilted sandstone bedrock, the solum thickness varies within short linear distances. Reaction ranges from medium acid to very strongly acid except where the A1 horizon has been limed. Texture throughout the solum, excluding coarse fragments, is sandy loam, fine sandy loam, or loam.

The A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Flat fragments of sandstone less than 75 mm in length make up 10 to 35 percent of the volume, and those more than 76 mm in length make up 10 to 15 percent.

The B21 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 to 6. Flat fragments of sandstone less than 76 mm in length make up 20 to 45 percent of the volume, and the more than 76 mm in length make up 15 to 45 percent.

The C horizon is tilted weathered sandstone bedrock. The B22 part of the C&B22 horizon is similar in color to the B21 horizon. It occurs in fractures of the tilted sandstone bedrock.

The R layer is hard fine grained sandstone in shades of brown, red, or yellow.

Pirum series

The Pirum series consists of moderately deep, well drained, moderately permeable soils on uplands. These soils formed in material weathered from sandstone interlaminated with thin layers of shale. They are on moderately steep to steep side slopes of the Ouachita Mountains. Slopes are 12 to 30 percent.

Pirum soils are geographically closely associated with Carnasaw, Clebit, and Stapp soils. Carnasaw and Stapp soils have a more clayey control section than Pirum soils. Clebit soils have a solum less than 20 inches thick.

Typical pedon of Pirum stony fine sandy loam in an area of Carnasaw-Pirum-Clebit association, dry, moderately steep, about 4 miles north of Jumbo along the Jumbo-Daisy road on pipeline right-of-way; approximately 4,000 feet south and 1,000 feet west of northeast corner sec. 4, T. 1 S., R. 15 E.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) stony fine sandy loam; weak medium and fine granular structure; friable; many fine roots; strongly acid; clear smooth boundary.

A2—4 to 10 inches; yellowish brown (10YR 5/4) stony fine sandy loam; weak medium and fine granular structure; friable; many fine roots; strongly acid; clear smooth boundary.

B21t—10 to 22 inches; reddish brown (5YR 5/3) sandy clay loam; common medium faint strong brown (7.5YR 5/6) mottles; weak medium and fine subangular blocky structure; firm; few fine roots; clay films on faces of peds; strongly acid; clear smooth boundary.

B22t—22 to 34 inches; reddish brown (5YR 5/3) sandy clay loam; many fine and medium distinct brown (7.5YR 4/2), yellowish brown (10YR 5/6), pale brown (10YR 6/3), strong brown (7.5YR 5/6) and red (2.5YR 5/6) mottles; weak medium and fine subangular blocky structure; patchy clay films on faces of peds; firm; strongly acid; abrupt irregular boundary.

R—34 to 40 inches; hard sandstone bedrock with thin interlaminated shale; tilted 40 degrees from horizontal.

Solum thickness and depth to bedrock range from 20 to 40 inches. Because of the underlying tilted bedrock, solum thickness varies within short linear distances. Reaction is strongly acid or very strongly acid throughout the solum. A Cr horizon is present in some areas.

The A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Stones make up 5 to 20 percent of the volume. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Stones make up 5 to 20 percent of the volume.

The B2t horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 3 to 8.

The R layer is hard fractured sandstone interlaminated with a few thin layers of shale. It is tilted 20 to 90 degrees from horizontal.

Pushmataha series

The Pushmataha series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in material weathered from loamy sediments of the Ouachita Mountains. They are saturated for short periods in winter and in spring. Slopes are 0 to 1 percent.

Pushmataha soils are geographically closely associated with Dela and Guyton soils. Dela soils have a more sandy control section than Pushmataha soils. Guyton soils have a more clayey control section.

Typical pedon of Pushmataha loam about 1 mile west of Sardis; approximately 1,200 feet west and 200 feet south of northeast corner sec. 8, T. 2 N., R. 18 E.

A11—0 to 12 inches; dark brown (10YR 4/3) loam; few fine distinct light gray mottles; weak fine and medium granular structure; friable; common fine and medium roots inside peds; medium acid; gradual smooth boundary.

A12—12 to 22 inches; brown (10YR 5/3) loam; few fine distinct light gray mottles; weak fine and medium granular structure; friable; common fine and medium roots inside peds; medium acid; gradual smooth boundary.

C1—22 to 38 inches; brown (10YR 5/3) loam; common fine and medium distinct yellowish brown (10YR 5/6) and light gray (10YR 7/1) mottles; massive; friable; common fine and medium roots inside peds; thin strata of fine sandy loam and silt loam; medium acid; gradual smooth boundary.

C2—38 to 60 inches; light gray (10YR 7/2) silt loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine roots inside peds; thin strata of loam and fine sandy loam; medium acid.

Reaction is slightly acid to neutral throughout the A and C horizons.

The A11 horizon has hue of 10YR, value of 4, and chroma of 2 to 4. The A12 horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 7, and chroma of 2 to 8. Mottles are in shades of brown or gray. Texture is loam, very fine sandy loam, or silt loam.

The C1 horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 7, and chroma of 2 to 8. Mottles are in shades of brown or gray. Texture is loam, very fine sandy loam, or silt loam. The C2 horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 7, and chroma of 2 to 8. Mottles are in shades of brown or gray. Texture is loam, very fine sandy loam, or silt loam.

Rexor series

The Rexor series consists of deep, well drained, moderately permeable soils on terraces. These soils formed in material weathered from loamy sediments. They have a perched water table at a depth of 3 to 4 feet in winter and in spring. Slopes are 0 to 1 percent.

Rexor soils are geographically closely associated with Dela, Pushmataha, and Guyton soils. Dela and Pushmataha soils have a less clayey control section than Rexor soils. Guyton soils are poorly drained and very slowly permeable.

Typical pedon of Rexor loam; approximately 2,000 feet east and 600 feet north of southwest corner sec. 36, T. 3 S., R. 17 E.

A1—0 to 8 inches; brown (10YR 4/3) loam; weak fine granular structure; friable; medium acid; gradual smooth boundary.

B21t—8 to 32 inches; strong brown (7.5YR 5/6) clay loam; moderate medium and fine subangular blocky structure; friable; thin clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t—32 to 46 inches; strong brown (7.5YR 5/6) clay loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak medium and fine subangular blocky structure; friable; thin clay films on faces of peds; strongly acid; gradual smooth boundary.

B3—46 to 66 inches; brown (7.5YR 4/4) loam; many medium distinct light brownish gray (10YR 6/2) mottles; weak coarse and medium subangular blocky structure; thin clay films are patchy on faces of peds; very strongly acid.

Solum thickness is 35 to 70 inches. Reaction ranges from medium acid to very strongly acid throughout the solum.

The A1 horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3.

The B2t horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. Texture is loam, silt loam, clay loam, or silty clay loam. The B3 horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 8. Texture is loam or silt loam.

Romia series

The Romia series consists of deep, well drained, moderately permeable soils on uplands. These soils formed in material weathered from unconsolidated sandstone of the Southern Coastal Plain. Slopes are 3 to 12 percent.

Romia soils are geographically closely associated with Bernow, Bosville, Glenpool, Kullit, Ruston, Saffell, and Hamden soils. Bernow and Ruston soils have a solum more than 60 inches thick. Bosville soils have a more clayey control section than Romia soils, and Glenpool soils have a more sandy control section. Kullit and Hamden soils are moderately well drained. Saffell soils have a loamy-skeletal control section.

Typical pedon of Romia fine sandy loam in an area of Bernow-Romia complex, 8 to 12 percent slopes, about 6 miles west of Antlers; approximately 2,300 feet north and 200 feet east of southwest corner sec. 3, T. 4 S., R. 15 E.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; medium acid; clear smooth boundary.

A2—4 to 13 inches; pale brown (10YR 6/3) fine sandy loam; weak fine granular structure; very friable; medium acid; clear smooth boundary.
B21t—13 to 34 inches; red (2.5YR 4/6) sandy clay loam; weak medium and fine subangular blocky structure; friable; clay films bridging sand grains; very strongly acid; gradual smooth boundary.
B22t—34 to 56 inches; yellowish red (5YR 4/6) sandy clay loam; weak fine granular structure; friable; clay films bridging sand grains; very strongly acid; clear smooth boundary.
Cr—56 to 60 inches; soft sandstone.

Solum thickness and depth to soft sandstone are 40 to 60 inches. The A1 horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. Reaction is slightly acid or medium acid. The A2 horizon has hue of 5YR, 7.5YR, or 10YR, value of 3 to 5, and chroma of 2 to 4. Reaction ranges from slightly acid to strongly acid.

The B2t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. Mottles in shades of yellow, brown, or gray occur in some pedons. Reaction ranges from medium acid to very strongly acid.

The Cr horizon is soft unconsolidated sandstone.

Ruston series

The Ruston series consists of deep, well drained, moderately permeable soils on uplands. These soils formed in material weathered from loamy sediments of the Southern Coastal Plain. Slopes are 0 to 8 percent.

Ruston soils are geographically closely associated with Bernow, Bosville, Romia, Saffell, Smithdale, Glenpool, and Kullit soils. Bernow soils have a higher level of natural fertility than Ruston soils. Bosville soils have a more clayey control section. Glenpool soils have a more sandy control section. Romia soils have a solum 40 to 60 inches thick. Saffell soils have a loamy-skeletal control section. Kullit soils are moderately well drained and have moderately slow permeability. Smithdale soils have slopes of 5 to 12 percent.

Typical pedon of Ruston loamy fine sand in an area of Ruston loamy fine sand, 0 to 3 percent slopes, about three-fourths mile north and one-fourth mile east of Corinne, approximately 1,400 feet south and 1,100 feet east of northwest corner sec. 23, T. 4 S., R. 19 E.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) loamy fine sand; structureless or weak fine granular; friable; medium acid; clear smooth boundary.
A2—3 to 17 inches; pale brown (10YR 6/3) loamy fine sand; structureless or weak fine granular; very friable; medium acid; clear smooth boundary.
B21t—17 to 26 inches; yellowish red (5YR 4/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; friable; thick clay films on faces of peds; strongly acid; clear wavy boundary.
B22t—26 to 42 inches; yellowish red (5YR 4/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; clay films on faces of peds; strongly acid; clear smooth boundary.
B23t&A'2—42 to 62 inches; the B23t part is yellowish red (5YR 4/6); sandy clay loam; many medium prominent red (2.5YR 4/8) mottles; moderate coarse prismatic structure; clay films on faces of peds; strongly acid. The A'2 part is vertical streaks that make up about 10 percent of the matrix; light brownish gray (10YR 6/2) fine sandy loam; massive; friable; strongly acid.

Solum thickness is more than 60 inches. The A1 and A2 horizons are medium acid. The B23t&A'2 horizon is strongly acid.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Texture is loamy fine sand or fine sandy loam. The A2 horizon has hue of 10YR, value of 5 to 8, and chroma of 3 to 8. Texture is loamy fine sand or fine sandy loam.

The B2t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. Mottles, where present, are in shades of red or brown. The B23t part of the B23t&A'2 horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8 or is mottled in shades of red brown, yellow, or gray. The A'2 part makes up 5 to 10 percent of the matrix. It has hue of 10YR, value of 6 or 7, and chroma of 1 or 2.

Saffell series

The Saffell series consists of deep, well drained, moderately permeable soils on uplands. These soils formed in material weathered from sandy to clayey sediments that have a high content of gravel. Slopes are 1 to 20 percent.

Saffell soils are geographically closely associated with Bernow, Bosville, Larue, Romia, Ruston, and Smithdale soils. The associated soils are not skeletal in the control section.

Typical pedon of Saffell gravelly sandy loam in an area of Saffell gravelly sandy loam, 1 to 5 percent slopes; approximately 1,415 feet south and 650 feet west of northeast corner sec. 9, T. 4 S., R. 17 E.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) gravelly sandy loam; weak fine granular structure; very friable; about 40 percent gravel by volume; medium acid; clear smooth boundary.
A2—3 to 9 inches; brown (7.5YR 5/4) very gravelly sandy loam; weak fine granular structure; very friable; about 50 percent gravel by volume; strongly acid; clear smooth boundary.
B1—9 to 15 inches; brown (7.5YR 4/4) very gravelly sandy clay loam; weak fine subangular blocky structure; firm; sand grains coated with clay films; gravel

makes up about 60 percent of the volume; strongly acid; clear smooth boundary.

B2t—15 to 32 inches; strong brown (7.5YR 5/6) very gravelly sandy clay loam; moderate fine subangular blocky structure; firm; gravel makes up about 65 percent of the volume; strongly acid; gradual smooth boundary.

B3—32 to 50 inches; strong brown (7.5YR 5/6) very gravelly sandy loam; weak fine subangular blocky structure; friable; clay films bridging sand grains; gravel makes up about 65 percent of the volume; strongly acid; gradual wavy boundary.

C—50 to 60 inches; similar to the B3 horizon but is 80 percent gravel by volume.

Solum thickness is 35 to 60 inches. The A horizon has hue of l0YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4.

The B2t and B3 horizons have hue of 2.5YR to 10YR, value of 3 to 6, and chroma of 4 to 8. Texture is the gravelly or very gravelly counterpart of sandy clay loam, fine sandy loam, or loam. Gravel ranges from 35 to 70 percent by volume.

The C horizon is from 20 to 80 percent gravel.

Shermore series

The Shermore series consists of deep, moderately well drained, moderately permeable soils on uplands. These soils formed in material weathered from loamy colluvial sediments. They occur in Ouachita Mountain valleys. They have a perched water table at a depth of 1 to 2 1/2 feet in winter and in spring. Slopes are 1 to 5 percent.

Shermore soils are geographically closely associated with Alikchi, Alikchi variant, Sherwood, and Zafra soils. Alikchi and Alikchi variant soils are poorly drained and are more silty in the control section than Shermore soils. Sherwood soils have a solum less than 60 inches thick. Zafra soils have a solum 20 to 40 inches thick and are loamy-skeletal in the control section.

Typical pedon of Shermore fine sandy loam in an area of Shermore fine sandy loam, 3 to 5 percent slopes; approximately 2,640 feet west and 1,200 feet south of northeast corner sec. 28, T. 1 S., R. 15 E.

A1—0 to 4 inches; brown (10YR 4/3) fine sandy loam; weak medium and fine granular structure; friable; medium acid; clear smooth boundary.

A2—4 to 12 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine and medium granular structure; friable; medium acid; clear wavy boundary.

B21t—12 to 16 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; firm; clay films on faces of peds; strongly acid; gradual wavy boundary.

B22t—16 to 22 inches; yellowish brown (10YR 5/4) sandy clay loam; moderate medium subangular blocky structure; firm; clay films on faces of peds, very strongly acid; gradual wavy boundary.

B23t—22 to 30 inches; yellowish brown (10YR 5/4) sandy clay loam; many fine distinct gray mottles; moderate medium subangular blocky structure; firm; clay films on faces of peds; very strongly acid; gradual irregular boundary.

B24t—30 to 65 inches; coarsely mottled gray (10YR 5/1), yellowish brown (10YR 5/4), and red (2.5YR 5/6) sandy clay loam; weak medium blocky structure; firm; patchy clay films on faces of peds; very strongly acid.

Solum thickness is more than 60 inches. The A1 or Ap horizon has hue of 10YR or 7.5YR, value of 2 to 6, and chroma of 1 to 7. The A2 horizon has hue of 10YR or 7.5YR, value of 2 to 5, and chroma of 3 or 4.

The B2t horizon has hue of 5YR to 10YR, value of 4 to 7, and chroma of 4 to 8. Texture is sandy clay loam, sandy loam, or loam. The B3 horizon is mottled in hue of 5YR through 10YR, value of 4 to 7, and chroma of 1 to 7.

Sherwood series

The Sherwood series consists of deep, well drained, moderately permeable soils on uplands. These soils formed in material weathered from sandstone interlaminated with thin layers of shale. Slopes are 3 to 8 percent.

Sherwood soils are geographically closely associated with Alikchi, Alikchi variant, Shermore, and Zafra soils. Alikchi and Alikchi variant soils are poorly drained and are more silty in the control section than Sherwood soils. Shermore soils have a solum more than 60 inches thick. Zafra soils have a loamy-skeletal control section.

Typical pedon of Sherwood fine sandy loam in an area of Sherwood-Zafra association, gently sloping, about 11 miles southwest of Clayton along highway 144, then 1 mile east; approximately 3,400 feet north and 100 feet east of southwest corner sec. 10, T. 1 S., R. 17 E.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; medium acid; clear smooth boundary.

A2—3 to 8 inches; pale brown (10YR 6/3) fine sandy loam; weak fine granular structure; medium acid; clear wavy boundary.

B21t—8 to 24 inches; yellowish red (5YR 5/6) gravelly sandy clay loam; moderate medium subangular blocky structure; friable; clay films on faces of peds; about 20 percent waterworn sandstone gravel by volume; very strongly acid; gradual smooth boundary.

B22t—24 to 42 inches; yellowish red (5YR 5/6) gravelly sandy clay loam; moderate medium subangular blocky structure; friable; clay films on faces of peds; about 25 percent waterworn gravel by volume; very strongly acid; gradual smooth boundary.

B3—42 to 55 inches; yellowish red (5YR 5/6) gravelly sandy loam; weak fine granular structure; friable; clear films bridging sand grains; about 30 percent waterworn sandstone and cobbles by volume; very strongly acid; wavy irregular boundary.

R—55 to 60 inches; hard sandstone with a few thin interlaminations of shale; tilted more than 20 degrees from horizontal.

Solum thickness ranges from 30 to 60 inches. Reaction in the A horizon ranges from medium acid to very strongly acid. The B horizon is strongly acid or very strongly acid.

The A1 horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. Sandstone fragments make up 0 to 20 percent of the volume. The A2 horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 or 4. Sandstone fragments make up 0 to 20 percent of the volume.

The B2t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. Texture is gravelly sandy clay loam or gravelly clay loam. Sandstone fragments make up 15 to 35 percent of the volume. The B3 horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. Texture is gravelly sandy loam, gravelly sandy clay loam, gravelly loam, or gravelly clay loam. Sandstone fragments make up 20 to 50 percent of the volume.

The R layer is hard sandstone with thin interlaminations of shale. It is tilted 20 to 90 degrees from horizontal.

Smithdale series

The Smithdale series consists of deep, well drained, moderately permeable soils on uplands. These soils formed in material weathered from loamy sediments of the Coastal Plain. Slopes are 5 to 12 percent.

Smithdale soils are geographically closely associated with Ruston and Saffell soils. Ruston soils have slopes of 0 to 5 percent. Saffell soils have a loamy-skeletal control section.

Typical pedon of Smithdale fine sandy loam in an area of Smithdale fine sandy loam, 5 to 12 percent slopes, about one-half mile south and one-half mile east of Corinne, 2,500 feet south and 2,100 feet east of northwest corner sec. 26, T. 4 S., R. 19 E.

A1—0 to 4 inches; brown (10YR 5/3) fine sandy loam; weak medium and fine granular structure; friable; medium acid; clear smooth boundary.

A2—4 to 9 inches; pale brown (10YR 6/3) fine sandy loam; weak medium and fine granular structure; friable; medium acid; clear smooth boundary.

B21t—9 to 13 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium and fine subangular blocky structure; friable; clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t—13 to 25 inches; dark red (2.5YR 3/6) sandy clay loam; weak medium and fine subangular blocky structure; friable; clay films on faces of peds; strongly acid; gradual smooth boundary.

B23t—25 to 40 inches; red (2.5YR 4/6) sandy clay loam; weak fine and medium subangular blocky structure; friable; clay films on faces of peds; strongly acid; gradual smooth boundary.

B24t—40 to 65 inches; red (2.5YR 4/6) sandy clay loam; common medium distinct yellowish red (5YR 4/6) mottles; moderate coarse prismatic structure; firm; clay films on faces of peds; strongly acid; about 10 percent vertical streaks of light gray (10YR 7/2) fine sandy loam; massive, friable; strongly acid.

Solum thickness is more than 60 inches. The A1 and A2 horizons are medium acid. The B2t horizon is strongly acid.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The A2 horizon has hue of 10YR, value of 5 to 8, and chroma of 3 to 8.

The B2t horizon has hue of 5YR or 2.5YR, value of 3 to 5, and chroma of 4 to 6. Mottles, where present, are in shades of red or brown. The B24t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8, or it is coarsely mottled in red, yellow, brown, or gray. Vertical streaks of fine sandy loam make up 5 to 10 percent of the matrix. They have hue of 10YR, value of 6 or 7, and chroma of 1 or 2.

Sobol series

The Sobol series consists of moderately deep, moderately well drained, slowly permeable soils on uplands. These soils formed in material weathered from shale. They are on gently sloping to strongly sloping sides and ridge crests in the valleys of the Ouachita Mountains. They have a perched water table at a depth of 1/2 to 1 1/2 feet in winter and in spring. Slopes are 3 to 12 percent.

Sobol soils are geographically closely associated with Alikchi, Alikchi variant, Burwell, Honobia, Nashoba, Tuskahoma, Clebit, and Wister soils. Alikchi and Alikchi variant soils are poorly drained and are less clayey in the control section than Sobol soils. Burwell soils are less clayey in the control section. Honobia soils have a clayey-skeletal control section. Nashoba and Clebit soils have a loamy-skeletal control section. Tuskahoma soils have a solum less than 20 inches thick. Wister soils have a very slow permeability, a thicker solum, and clay closer to the surface.

Typical pedon of Sobol loam in an area of Sobol-Tuskahoma association, strongly sloping, about 3 miles north of Antlers; approximately 2,800 feet east and 500 feet north of southwest corner sec. 23, T. 3 S., R. 16 E.

A1—0 to 7 inches; very dark grayish brown (10YR 3/2) loam; moderate medium granular structure; friable;

many roots of all sizes; neutral; clear smooth boundary.

B1—7 to 14 inches; dark grayish brown (2.5Y 4/2) clay loam; moderate medium granular structure; firm; many roots of all sizes; medium acid; clear smooth boundary.

B2t—14 to 25 inches; red (2.5YR 4/6) clay; many medium prominent gray (10YR 5/1) mottles and a few medium prominent strong brown (7.5YR 5/6) mottles; weak to moderate blocky structure; very firm; common fine roots; few shale fragments; clay films on faces of peds; slightly acid; gradual smooth boundary.

B3—25 to 30 inches; gray (10YR 5/1) clay; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium blocky structure; very firm; few fine roots; common shale fragments; clay films on faces of peds; mildly alkaline; clear irregular boundary.

Cr—30 to 35 inches; gray shale tilted more than 20 degrees from horizontal.

Solum thickness is 20 to 40 inches. Reaction ranges from neutral to strongly acid in the A1 and B1 horizons. It ranges from moderately alkaline to very strongly acid in the B2t and B3 horizons.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3. Mottles in shades of brown or gray are in some areas. Coarse fragments of sandstone or shale less than 75 mm in diameter make up 0 to 10 percent of the volume, and those larger than 7.5 mm in diameter make up 0 to 10 percent by volume.

The B1 horizon has hue of 2.5Y to 5YR, value of 3 to 5, and chroma of 2 to 6. Mottles in shades of red, brown, or gray are in some areas. Texture is clay loam, silt loam, or silty clay loam. Coarse fragments of sandstone or shale less than 75 mm in diameter make up 0 to 10 percent of the volume. The B2t horizon has hue of 2.5YR to 5Y, value of 3 to 5, and chroma of 1 to 6, or it is mottled in shades of olive red, brown, or gray. Texture is clay or silty clay. Coarse fragments of sandstone or shale less than 75 mm in diameter make up 0 to 10 percent of the volume. The B3 horizon has hue of 2.5YR to 5Y, value of 4 or 5, and chroma of 1 to 6. Mottles are in shades of red, brown, or gray. Texture is clay or shaly clay. Shale fragments less than 75 mm in diameter make up 5 to 20 percent of the volume.

The Cr horizon is shale in shades of gray, olive, or brown, and it is tilted 20 to 90 degrees from horizontal.

Speer series

The Speer series consists of deep, well drained, moderately permeable soils on terraces. These soils formed in material weathered from loamy sediments. They are on creeks and rivers in the Ouachita Mountains. Slopes are 1 to 3 percent.

Speer soils are geographically closely associated with Dela, Elysian, and Guyton soils. Dela and Elysian soils have less clay and more sand in the control section. Guyton soils are more silty in the control section and are poorly drained.

Typical pedon of Speer loam in an area of Speer loam, 1 to 3 percent slopes; approximately 1,000 feet east and 300 feet north of southwest corner sec. 8, T. 3 S., R. 16 E.

A1—0 to 9 inches; brown (10YR 4/3) loam; weak medium and fine granular structure; friable; many fine roots; medium acid; clear smooth boundary.

B1—9 to 15 inches; yellowish brown (10YR 5/4) loam; weak medium and fine granular structure; friable; many fine roots; medium acid; gradual smooth boundary.

B21t—15 to 24 inches; reddish brown (5YR 5/4) clay loam; weak medium subangular blocky structure; friable; common fine roots; clay films on faces of peds; medium acid; gradual smooth boundary.

B22t—24 to 34 inches; strong brown (7.5YR 5/6) clay loam; weak medium and fine subangular blocky structure; friable; common fine roots; clay films on faces of peds; medium acid; gradual smooth boundary.

B3—34 to 55 inches; strong brown (7.5YR 5/6) loam; few fine distinct red (2.5YR 4/6) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; patchy clay films on faces of peds; strongly acid; clear smooth boundary.

C—55 to 72 inches; coarsely mottled brownish yellow (10YR 6/8), yellowish brown (10YR 5/4), and light gray (10YR 7/1) loam; massive; friable; very strongly acid.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 2 or 3. It is loam or fine sandy loam and is neutral to strongly acid.

The B1 horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 to 8. It is loam, fine sandy loam, sandy clay loam, and clay loam. Reaction is medium acid to very strongly acid. The B2t horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam, loam, or clay loam. Reaction is medium acid to very strongly acid. The B3 horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 1 to 8. It is loam or fine sandy loam. Reaction is medium acid to very strongly acid.

The C horizon has hue of 5YR to 10YR, value of 5 to 7, and chroma of 1 to 6. In some pedons it is coarsely mottled in shades of red, brown, and gray. It is loam or fine sandy loam. Coarse fragments less than 75 mm in diameter make up 0 to 10 percent of the volume. Reaction is slightly acid to very strongly acid.

Stapp series

The Stapp series consists of deep, moderately well drained, slowly permeable soils on uplands. These soils formed in material weathered from shale. They are in gently sloping to strongly sloping areas in the Ouachita Mountains. The solum is saturated in winter and early in spring. Slopes are 8 to 12 percent.

Stapp soils are geographically closely associated with Carnasaw, Clebit, and Nashoba soils. Carnasaw soils are well drained. Clebit and Nashoba soils have a loamy-skeletal control section.

Typical pedon of Stapp stony fine sandy loam in an area of Carnasaw-Stapp association, strongly sloping; approximately 1,320 feet south and 1,320 feet east of northwest corner sec. 10, T. 3 S., R. 16 E.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) stony fine sandy loam; weak and moderate medium granular structure; friable; strongly acid; abrupt smooth boundary.

A2—2 to 8 inches; brown (10YR 5/3) stony fine sandy loam; weak fine and medium granular and weak fine subangular blocky structure; friable; strongly acid; clear smooth boundary.

B21t—8 to 22 inches; red (2.5YR 5/6) clay; moderate medium blocky structure; firm; clay films on faces of peds; very strongly acid; gradual smooth boundary.

B22t—22 to 36 inches; red (2.5YR 5/6) clay; many medium prominent light brownish gray (10YR 6/2) mottles; firm; clay films on faces of peds; very strongly acid; gradual smooth boundary.

B23t—36 to 44 inches; coarsely mottled red (2.5YR 5/6) and gray (10YR 6/1) clay; moderate medium blocky structure; firm; patchy clay films on faces of peds; very strongly acid; abrupt irregular boundary.

Cr—44 to 50 inches; gray weathered shale; strongly acid; tilted 20 degrees from horizontal.

The solum thickness ranges from 40 to 60 inches. Reaction is strongly acid or very strongly acid in all horizons.

The A1 horizon has hue of 10YR, value of 4, and chroma of 2 or 3. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3.

The B21t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. The B22t and B23t horizons have colors similar to those of the B21t horizon, or they are mottled in shades of red, brown, or gray.

Swink series

The Swink series consists of shallow, well drained, slowly permeable soils on uplands. These soils formed in material weathered from limestone. Slopes are 2 to 8 percent.

Swink soils are geographically closely associated with Hollywood and Bosville soils. Hollywood soils have a thick solum and are not skeletal. Bosville soils have a thick solum and an argillic horizon.

Typical pedon of Swink stony clay in an area of Hollywood-Swink complex, 2 to 8 percent slopes, about 4 miles south and 6 miles west of Antlers; approximately 2,900 feet south and 500 feet east of northwest corner sec. 34, T. 4 S., R. 15 E.

A11—0 to 10 inches; very dark gray (10YR 3/1) stony clay; moderate fine subangular blocky structure breaking to moderate coarse and medium granular; firm; many fine roots; about 25 percent by volume limestone fragments 3 to 10 inches in diameter and 35 percent limestone fragments greater than 10 inches in diameter; calcareous; moderately alkaline; gradual smooth boundary.

A12—10 to 15 inches; very dark grayish brown (2.5Y 3/2) stony clay; moderate fine subangular blocky structure breaking to moderate fine granular; firm; many fine roots; about 35 percent by volume limestone fragments greater than 10 inches in diameter and 25 percent limestone fragments 3 to 10 inches in diameter; calcareous; moderately alkaline; abrupt irregular boundary.

R—15 to 20 inches; fractured hard limestone.

The content of limestone fragments ranges from 35 to 60 percent of the volume in all horizons, but it tends to be higher in the A11 horizon.

The A horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 2 or 3, and chroma of 1 to 3.

The R layer is hard limestone bedrock that is fractured. It ranges from a few feet to several feet in thickness.

Tuskahoma series

The Tuskahoma series consists of shallow, moderately well drained, very slowly permeable soils on uplands. These soils formed in material weathered from shale. They are on side slopes and in valleys of the Ouachita Mountains. Slopes are 8 to 12 percent.

Tuskahoma soils are geographically closely associated with Alikchi, Alikchi variant, Burwell, Honobia, Nashoba, Sobol, Wister, and Clebit soils. Alikchi, Alikchi variant, and Burwell soils have a less clayey control section. Honobia, Nashoba, and Clebit soils have a skeletal control section. Sobol and Wister soils have a thicker solum.

Typical pedon of Tuskahoma loam in an area of Tuskahoma-Clebit-Sobol association, strongly sloping; approximately 1,900 feet west and 1,000 feet north of southeast corner sec. 3, T. 2 N., R. 22 E.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) loam; moderate fine granular structure; friable; sandstone fragments less than 3 inches in diameter make up 10 percent by volume; medium acid; abrupt smooth boundary.

B2t—4 to 12 inches; dark yellowish brown (10YR 4/4) clay; few fine prominent gray and reddish brown mottles; moderate medium blocky structure; firm; clay films on faces of peds; few shale fragments; medium acid; gradual wavy boundary.

B3—12 to 18 inches; gray (10YR 5/1) shaly clay; common fine distinct yellowish red (5YR 5/6) mottles; weak fine blocky structure; very firm; patchy clay films on faces of peds; 20 percent shale fragments by volume; medium acid; gradual irregular boundary.

Cr—18 to 25 inches; gray shales with thin layers of shaly clay; mildly alkaline; tilted 40 degrees from horizontal.

Solum thickness is 10 to 20 inches. The A1 horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 2 to 4. Reaction ranges from medium acid to neutral.

The B2t horizon has hue of 5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 6. Texture is clay, silty clay, or silty clay loam. Reaction ranges from slightly acid to strongly acid. The B3 horizon has colors similar to those of the B2t horizon. In places it has hue of 5Y, value of 3 to 6, and chroma of 1 or 2. Texture is shaly clay, shaly silty clay, or shaly silty clay loam. Reaction ranges from medium acid to mildly alkaline.

The Cr horizon is shale in shades of gray, olive, or brown. Thin layers of shaly clay are in some areas. Reaction ranges from slightly acid to moderately alkaline.

Wister series

The Wister series consists of deep, moderately well drained, very slowly permeable soils on uplands. These soils formed in material weathered from shale. They are in valleys and on side slopes in the Ouachita Mountains. Slopes are 0 to 5 percent.

Wister soils are geographically closely associated with Burwell, Moyers, Sobol, and Tuskahoma soils. Burwell soils have a less clayey control section than Wister soils. Moyers soils have slow permeability, and the upper horizons are thicker over clayey textures. The solum of Sobol and Tuskahoma soils is less thick than that of Wister soils.

Typical pedon of Wister silt loam in an area of Wister-Burwell complex, 1 to 3 percent slopes; approximately 2,000 feet south and 100 feet east of northwest corner of sec. 28, T. 2 S., R. 15 E.

A1—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam; weak medium granular structure; friable; many fine roots; medium acid; clear smooth boundary.

A2—9 to 14 inches; grayish brown (10YR 5/2) silt loam; weak medium granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

B21t—14 to 34 inches; olive brown (2.5Y 4/4) clay; many coarse distinct grayish brown (10YR 5/2) mottles; weak medium and coarse blocky structure; firm; clay films on faces of peds; medium acid; clear smooth boundary.

B22t—34 to 52 inches; olive brown (2.5Y 4/4) clay; many coarse distinct grayish brown (10YR 5/2) mottles; weak medium and coarse blocky structure; firm; clay films on faces of peds; a few ferromanganese concretions; neutral; clear irregular boundary.

Cr—52 to 60 inches; olive brown (2.5Y 4/4) shale; tilted 20 degrees from horizontal.

Solum thickness and depth to shale bedrock range from 40 to 60 inches. The A1 horizon has hue of 10YR, value of 3 to 4, and chroma of 1 to 3. Reaction ranges from medium acid to very strongly acid. The A2 horizon, where present, has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. Reaction ranges from medium acid to very strongly acid.

The B2t horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6. Mottles are in shades of red, brown, or gray. Texture is clay, silty clay, silty clay loam, or clay loam. Reaction ranges from medium acid to very strongly acid in the upper part and from medium acid to moderately alkaline in the lower part.

The Cr horizon is tilted 20 to 50 degrees from horizontal.

Wrightsville series

The Wrightsville series consists of deep, poorly drained, very slowly permeable soils on terraces. These soils formed in material weathered from clayey sediments. They are saturated in winter and in spring. Slopes are 0 to 1 percent.

Wrightsville soils are geographically closely associated with Elysian soils. Elysian soils are less clayey in the control section.

Typical pedon of Wrightsville silt loam in an area of Wrightsville-Elysian complex, undulating; approximately 2,500 feet west and 75 feet south of northeast corner sec. 25, T. 4 S., R. 17 E.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; strongly acid; clear smooth boundary.

A2g—3 to 11 inches; light gray (10YR 7/2) silt loam; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; weak fine granular structure; strongly acid; abrupt irregular boundary.

Bg&Ag—11 to 26 inches; the Bg part is gray (10YR 5/1) silty clay; common medium distinct yellowish brown (10YR 5/6) and dark grayish brown (10YR 4/2) mottles; weak medium prismatic structure; firm patchy clay films on faces of peds; strongly acid. The Ag part is vertical streaks that make up about 10 percent of the horizon; light gray (10YR 7/2) silt loam; strongly acid; gradual wavy boundary.

B2tg—26 to 36 inches; gray (10YR 6/1) silty clay; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; clay films on faces of peds; light gray (10YR 7/2) silt coatings on surfaces of peds; very strongly acid; gradual wavy boundary.

B3g—36 to 48 inches; gray (10YR 6/1) silty clay; common coarse distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

C—48 to 60 inches; gray (10YR 6/1) silty clay; common coarse distinct yellowish brown (10YR 5/6) mottles; massive; firm; strongly acid.

Solum thickness ranges from 40 to 70 inches. Reaction is strongly acid to extremely acid throughout the solum. The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2. The A2g horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2.

The Bg part of the Bg&Ag horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Texture is silty clay or clay. The Ag part has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is silt loam or loam. It occurs as vertical streaks or as coatings on faces of peds that make up the Bg part. The B2tg and B3g horizons have hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2.

The C horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2.

Yanush series

The Yanush series consists of deep, well drained, moderately permeable soils on uplands. These soils formed in material weathered from cherty outwash sediments. They are on side slopes and foot slopes in the Potatoe Hills, which are part of the Ouachita Mountains. Slopes are 1 to 20 percent.

Yanush soils are geographically closely associated with Bigfork soils. Bigfork soils have a solum that is less thick than that of Yanush soils, and they formed from chert.

Typical pedon of Yanush cherty silt loam in an area of Yanush cherty silt loam, 3 to 5 percent slopes; approximately 750 feet west of southeast corner sec. 9, T. 2 N., R. 19 E.

A1—0 to 4 inches; dark brown (10YR 3/3) cherty silt loam; weak coarse and medium subangular blocky structure breaking to weak medium granular; friable; chert fragments one-half to 3 inches in diameter make up about 20 percent by volume; medium acid; clear smooth boundary.

A2—4 to 16 inches; dark yellowish brown (10YR 3/4) cherty silt loam; weak coarse and medium subangular blocky structure breaking to weak medium granular; friable; chert fragments make up about 20 percent of the volume; medium acid; clear smooth boundary.

B21t—16 to 20 inches; dark reddish brown (5YR 3/4) very cherty silty clay loam; weak medium subangular blocky structure; friable; chert fragments make up about 50 percent of the volume; clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t—20 to 40 inches; yellowish red (5YR 4/6) very cherty silty clay loam; moderate medium subangular blocky structure; friable; chert fragments make up about 80 percent of the volume; clay films on faces of peds; very strongly acid; gradual smooth boundary.

B23t—40 to 70 inches; yellowish red (5YR 5/6) very cherty silty clay loam; moderate medium subangular blocky structure; friable; chert fragments make up about 85 percent of the volume; clay films on faces of peds; very strongly acid.

Solum thickness is more than 60 inches. Thickness to bedrock ranges from 5 to 30 feet. The A horizon is 20 to 90 percent chert fragments by volume, and the B horizon is 35 to 90 percent chert fragments. Most chert fragments are 1 to 3 inches in diameter, but some are as much as 2 feet. The size of chert fragments tends to increase with increasing depth.

The A1 horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. Reaction ranges from slightly acid to strongly acid. The A2 horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6. Texture is the cherty or very cherty counterpart of silt loam, loam, or fine sandy loam. Reaction ranges from slightly acid to strongly acid.

The B2t horizon has hue of 2.5YR to 2.5Y, value of 3 to 6, and chroma of 4 to 8. Texture is the cherty or very cherty counterpart of clay loam, silty clay loam, silt loam, or clay. Reaction is strongly acid or very strongly acid.

Zafra series

The Zafra series consists of moderately deep to deep, well drained, moderately permeable soils on uplands. These soils formed in material weathered from sandstone. They are on dissected ridge crests and side slopes and in valleys in the Ouachita Mountains. Slopes are 3 to 8 percent.

Zafra soils are geographically closely associated with Alikchi, Alikchi variant, Sherwood, and Shermore soils. The associated soils are not skeletal in the control section.

Typical pedon of Zafra fine sandy loam in an area of Sherwood-Zafra association, gently sloping; approximately 3,800 feet north and 100 feet east of the southwest corner of sec. 10, T. 1 S., R. 17 E.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable;

about 5 percent waterworn sandstone gravel by volume; medium acid; clear smooth boundary.

A2—4 to 9 inches; pale brown (10YR 6/3) fine sandy loam; weak fine granular structure; friable; about 5 percent waterworn sandstone gravel by volume; strongly acid; clear smooth boundary.

B21t—9 to 20 inches; yellowish red (5YR 5/6) very gravelly sandy clay loam; moderate medium subangular blocky structure; friable; about 50 percent waterworn sandstone gravel by volume; clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t—20 to 40 inches; yellowish red (5YR 5/6) very gravelly sandy clay loam; moderate medium subangular blocky structure; friable; about 60 percent waterworn sandstone gravel and cobbles by volume; clay films on faces of peds; very strongly acid; gradual smooth boundary.

B3—40 to 55 inches; yellowish red (5YR 5/6) very gravelly sandy loam; moderate medium subangular blocky structure; friable; about 60 percent waterworn sandstone gravel and cobbles. Patchy clay films on faces of peds; very strongly acid; clear irregular boundary.

R—55 to 60 inches; hard sandstone with few interlaminated shale layers; tilted more than 20 degrees from horizontal.

Solum thickness ranges from 25 to 60 inches. Reaction is medium acid to strongly acid in the A horizon and strongly acid or very strongly acid in the B horizon.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Coarse fragments more than 3 inches in diameter make up 0 to 2 percent of the volume, and those less than 3 inches in diameter make up about 5 to 20 percent. The A2 horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 6.

The B1 horizon, where present, has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. Texture is gravelly fine sandy loam, gravelly clay loam, gravelly sandy clay loam, or gravelly loam. The B2t horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 8. Texture is the gravelly or very gravelly counterpart of sandy clay loam, clay loam, or loam. Coarse fragments make up 35 to 70 percent of the volume. The B3 horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 8. Texture is the gravelly or very gravelly counterpart of sandy loam, loam, or sandy clay loam. Coarse fragments make up about 35 to 70 percent of the volume.

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Glossary

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim. An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	More than 9

Base saturation. The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to frequent flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Coarse textured (light textured) soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the bases of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Complex, soil. A mapping unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire," when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is 40 or 80 inches (1 or 2 meters).

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave. Unstable walls of cuts made by earth-moving equipment. The soil sloughs easily.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. A delay in grazing until range plants have reached a specified stage of growth. Grazing is deferred in order to increase the vigor of forage and to allow desirable plants to produce seed. Contrasts with continuous grazing and rotation grazing.

Depth to rock. Bedrock at a depth that adversely affects the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess alkali. Excess exchangeable sodium. The resulting poor physical properties restrict the growth of plants.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime. Excess carbonates. Excessive carbonates, or lime, restrict the growth of some plants.

Excess salts. Excess water soluble salts. Excessive salts restrict the growth of most plants.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake. The rapid movement of water into the soil.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or

commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

Forb. Any herbaceous plant not a grass or a sedge.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material from 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table, which is the upper limit of saturation.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hummocky. Refers to a landscape of hillocks, separated by low sags, having sharply rounded tops and steep sides. Hummocky relief resembles rolling or undulating relief, but the tops of ridges are narrower and the sides are shorter and less even.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered, but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants are those that follow disturbance of the surface.

Large stones. Rock fragments 10 inches (25 centimeters) or more across. Large stones adversely affect the specified use.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. Inadequate strength for supporting loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous areas. Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured (moderately heavy textured) soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Pan. A compact, dense layer in a soil. A pan impedes the movement of water and the growth of roots. The word "pan" is commonly combined with other words that more explicitly indicate the nature of the layer; for example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differences are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water of subsurface tunnels or pipelike cavities in the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Productivity (soil). The capability of a soil for producing a specified plant or sequence of plants under a specified system of management. Productivity is measured in terms of output, or harvest, in relation to input.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Range (or rangeland). Land that, for the most part, produces native plants suitable for grazing by livestock; includes land supporting some forest trees.

Range condition. The health or productivity of forage plants on a given range, in terms of the potential productivity under normal climate and the best practical management. Condition classes generally recognized are—*excellent, good, fair,* and *poor.* The classification is based on the percentage of original, or assumed climax vegetation on a site, as compared to what has been observed to grow on it when well managed.

Range site. An area of range where climate, soil, and relief are sufficiently uniform to produce a distinct kind and amount of native vegetation.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulates over disintegrating rock.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots. See Root zone.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline-alkali soil. A soil that contains a harmful concentration of salts and exchangeable sodium; contains harmful salts and is strongly alkaline; or contains harmful salts and exchangeable sodium and is very strongly alkaline. The salts, exchangeable sodium, and alkaline reaction are in the soil in such location that growth of most crop plants is less than normal.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chos age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. Locally, a small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake. The slow movement of water into the soil.

Slow refill. The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones. Rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Small stones adversely affect the specified use.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na@ to Ca@@ Mg@@. The degrees of sodicity are—

	SAR
Slight	Less than 13:1
Moderate	13-30:1
Strong	More than 30:1

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.005 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil, or partly worked into the soil, to provide protection from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use or management.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is

generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Trace elements. The chemical elements in soils, in only extremely small amounts, essential to plant growth. Examples are zinc, cobalt, manganese, copper, and iron.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited geographic soil area does not justify creation of a new series.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.
Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.
Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.
Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

ILLUSTRATIONS

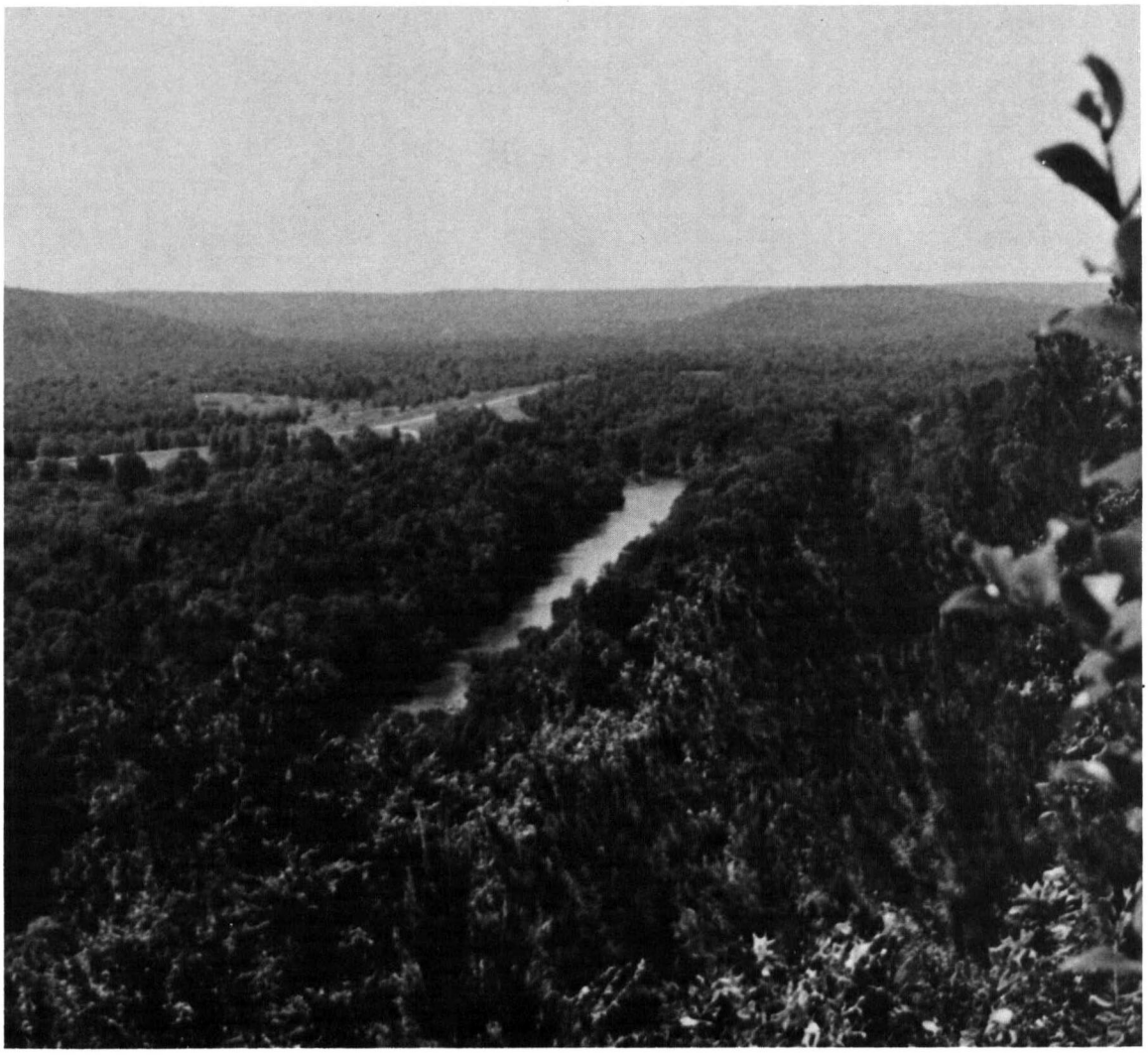

Figure 1.—Dela-Guyton-Pushmataha unit on flood plains along the Kiamichi River. On the uplands is the Carnasaw-Pirum-Clebit unit.

Figure 2.—Pasture on the moderately steep Carnasaw-Pirum-Clebit association. In the foreground is the Clebit soil. The wooded ridge is the Carnasaw soil.

Figure 3.—Bermudagrass and white clover on Boggy fine sandy loam. The strongly sloping Carnasaw-Stapp association in the background is used as range.

Figure 4.—Fescue on Hamden fine sandy loam, 0 to 2 percent slopes, provides large amounts of forage.

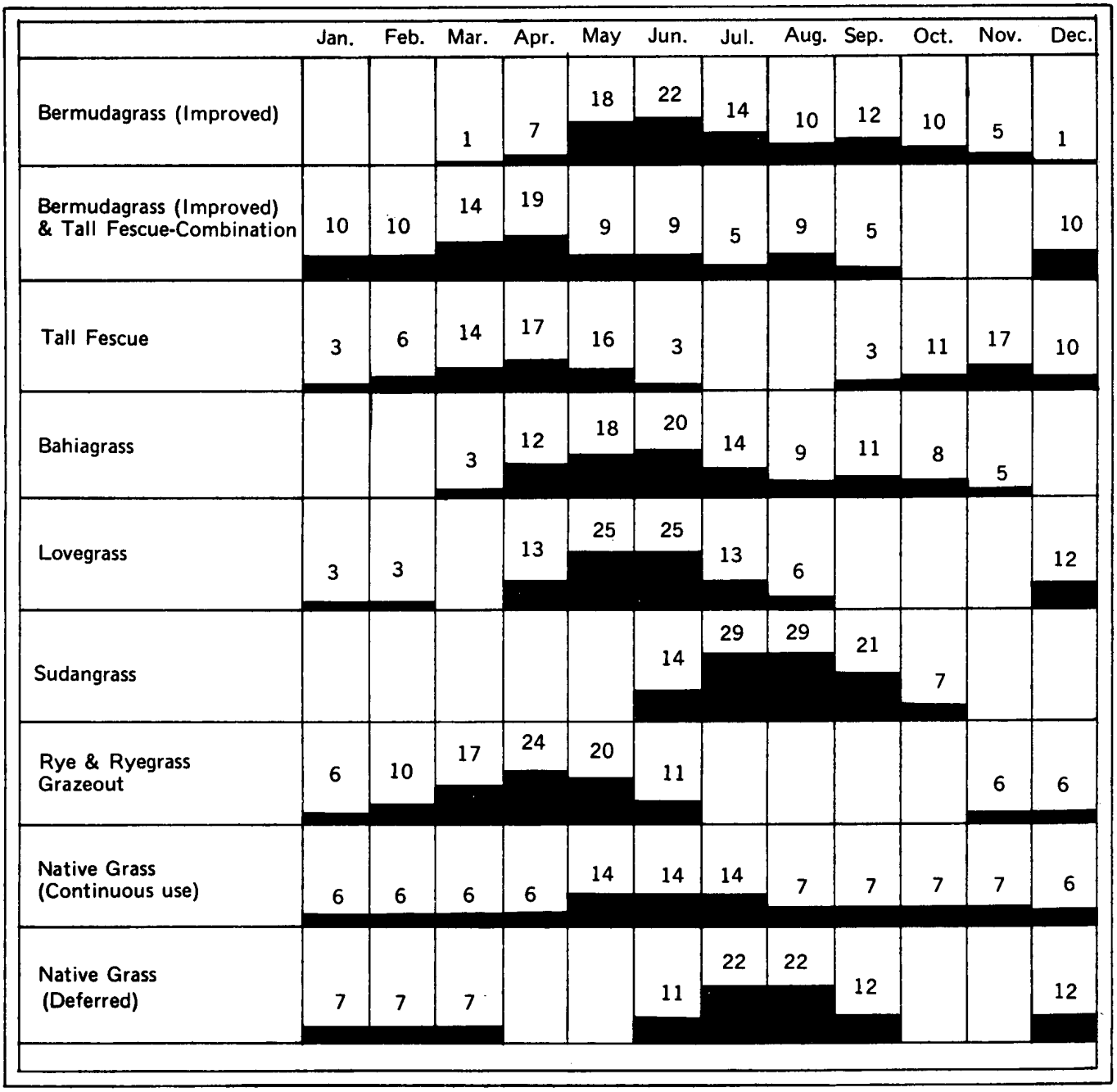

Figure 5.—Forage calendar showing monthly growth as a percentage of the forage produced annually.

Figure 6.—Loblolly pine on broad smooth ridges of Bernow fine sandy loam, 1 to 3 percent slopes.

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

Month	Temperature[1]						Precipitation[1]				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[2]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	53.6	29.2	41.4	78	5	21	2.16	.96	3.13	4	1.6
February	58.3	33.0	45.6	80	11	52	2.77	1.38	3.90	5	.7
March	66.0	40.2	53.1	87	18	194	3.36	1.78	4.64	6	.1
April	75.2	50.7	63.0	89	28	390	5.37	2.55	7.67	7	.0
May	81.8	58.1	70.0	93	39	620	5.99	3.11	8.34	7	.0
June	89.1	66.2	77.7	99	50	831	4.16	1.71	6.14	5	.0
July	94.3	69.6	82.0	104	57	992	3.43	.72	5.54	5	.0
August	94.2	68.0	81.1	105	55	964	3.52	1.44	5.20	5	.0
September	87.0	61.7	74.4	101	42	732	5.72	2.47	8.42	6	.0
October	77.8	50.3	64.1	93	30	437	4.22	1.15	6.68	4	.0
November	65.2	39.0	52.1	84	17	129	3.23	1.35	4.75	4	.2
December	56.1	31.9	44.0	77	10	40	3.11	1.19	4.65	5	.4
Year	74.9	49.8	62.4	106	2	5,402	47.04	38.36	55.29	63	3.0

[1]Recorded in the period 1951-74 at Antlers, Okla.

[2]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature[1]		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 26	April 3	April 20
2 years in 10 later than--	March 19	March 29	April 15
5 years in 10 later than--	March 7	March 20	April 6
First freezing temperature in fall:			
1 year in 10 earlier than--	October 31	October 26	October 19
2 years in 10 earlier than--	November 8	October 30	October 23
5 years in 10 earlier than--	November 23	November 8	October 31

[1]Recorded in the period 1951-74 at Antlers, Okla.

TABLE 3.--GROWING SEASON LENGTH

Probability	Daily minimum temperature during growing season[1]		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	236	211	190
8 years in 10	244	218	196
5 years in 10	260	233	207
2 years in 10	276	247	219
1 year in 10	285	254	225

[1]Recorded in the period 1951-74 at Antlers, Okla.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Alikchi loam, 1 to 3 percent slopes	6,626	0.7
2	Alikchi Variant silt loam, 0 to 2 percent slopes	1,504	0.2
3	Bernow fine sandy loam, 1 to 3 percent slopes	6,278	0.7
4	Bernow fine sandy loam, 3 to 5 percent slopes	4,737	0.5
5	Bernow-Romia complex, 8 to 12 percent slopes	20,608	2.3
6	Bernow, Bosville, and Romia soils, gullied	7,498	0.8
7	Bigfork-Yanush association, steep	13,569	1.5
8	Boggy fine sandy loam	10,835	1.2
9	Bosville fine sandy loam, 3 to 5 percent slopes	1,007	0.1
10	Bosville fine sandy loam, 5 to 12 percent slopes	2,555	0.3
11	Carnasaw-Pirum-Clebit association, moderately steep	216,260	23.7
12	Carnasaw-Pirum-Clebit association, dry, moderately steep	69,912	7.7
13	Carnasaw-Stapp association, strongly sloping	54,538	6.0
14	Carnasaw-Stapp association, dry, strongly sloping	10,121	1.1
15	Ceda cherty silt loam, occasionally flooded	1,323	0.1
16	Ceda cherty silt loam, frequently flooded	2,082	0.2
17	Ceda-Rubble land complex	12,298	1.4
18	Clebit-Pirum-Carnasaw association, steep	82,299	9.0
19	Clebit-Pirum-Carnasaw association, dry, steep	27,914	3.1
20	Clebit-Rock outcrop association, steep	11,300	1.2
21	Dela fine sandy loam, occasionally flooded	8,927	1.0
22	Dela fine sandy loam, frequently flooded	14,078	1.5
23	Glenpool loamy fine sand, 0 to 3 percent slopes	1,346	0.1
24	Glenpool loamy fine sand, 3 to 12 percent slopes	3,624	0.4
25	Guyton silt loam	9,167	1.0
26	Guyton-Elysian complex, undulating	2,451	0.3
27	Hamden fine sandy loam, 0 to 2 percent slopes	1,387	0.2
28	Hollywood-Swink complex, 2 to 8 percent slopes	305	*
29	Honobia-Nashoba association, strongly sloping	21,519	2.4
30	Kullit fine sandy loam, 0 to 2 percent slopes	2,753	0.3
31	Larue loamy fine sand, 0 to 3 percent slopes	2,818	0.3
32	Larue loamy fine sand, 3 to 8 percent slopes	6,211	0.7
33	Moyers-Burwell complex, 1 to 3 percent slopes	830	0.1
34	Moyers-Burwell complex, 3 to 5 percent slopes	1,716	0.2
35	Moyers, Wister, and Burwell soils, gullied	1,286	0.1
36	Nahatche Variant sandy loam	1,935	0.2
37	Pushmataha loam	8,204	0.9
38	Pushmataha, Elysian, and Guyton soils	17,716	1.9
39	Rexor loam	2,740	0.3
40	Ruston loamy fine sand, 0 to 3 percent slopes	854	0.1
41	Ruston loamy fine sand, 3 to 8 percent slopes	6,056	0.7
42	Ruston fine sandy loam, 1 to 3 percent slopes	1,096	0.1
43	Ruston fine sandy loam, 3 to 5 percent slopes	4,426	0.5
44	Saffell gravelly sandy loam, 1 to 5 percent slopes	1,334	0.1
45	Saffell gravelly sandy loam, 5 to 20 percent slopes	5,093	0.6
46	Shermore fine sandy loam, 1 to 3 percent slopes	5,683	0.6
47	Shermore fine sandy loam, 3 to 5 percent slopes	13,251	1.5
48	Shermore fine sandy loam, 2 to 5 percent slopes, eroded	3,522	0.4
49	Sherwood-Zafra association, gently sloping	18,898	2.1
50	Sherwood-Zafra association, sloping	33,934	3.7
51	Smithdale fine sandy loam, 5 to 12 percent slopes	1,023	0.1
52	Sobol clay loam, 3 to 5 percent slopes	3,619	0.4
53	Sobol-Tuskahoma association, strongly sloping	16,513	1.8
54	Speer loam, 1 to 3 percent slopes	4,113	0.5
55	Tuskahoma-Clebit-Sobol association, strongly sloping	100,724	11.1
56	Udorthents	189	*
57	Wister-Burwell complex, 0 to 1 percent slopes	649	0.1
58	Wister-Burwell complex, 1 to 3 percent slopes	3,435	0.4
59	Wrightsville-Elysian complex, undulating	6,459	0.7
60	Yanush cherty silt loam, 1 to 3 percent slopes	1,132	0.1
61	Yanush cherty silt loam, 3 to 5 percent slopes	2,345	0.3
62	Yanush cherty silt loam, 5 to 20 percent slopes	4,095	0.4
	Total	910,720	100.0

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates the crop or pasture grass is seldom grown or is not suited]

Soil name and map symbol	Improved bermudagrass	Improved bermudagrass and tall fescue combination	Tall fescue	Bahiagrass	Weeping lovegrass	Sudangrass	Rye and ryegrass graze out
	AUM	AUM	AUM	AUM	AUM	AUM	AUM
1---Alikchi	5.0	5.5	6.0	5.0	---	---	---
2---Alikchi variant	5.0	5.5	6.0	5.0	---	---	---
3---Bernow	7.5	---	---	6.5	7.5	3.6	4.3
4---Bernow	7.0	---	---	6.0	7.0	2.5	4.1
5*---Bernow	5.0	---	---	4.5	5.0	---	---
6*---Bernow	4.5	---	---	4.0	4.0	---	---
8---Boggy	12.0	11.0	10.0	---	---	---	---
9---Bosville	6.5	---	---	6.0	6.0	---	---
10---Bosville	6.0	---	---	5.5	6.0	---	---
15---Ceda	4.0	---	---	4.0	---	---	---
16---Ceda	4.0	---	---	4.0	---	---	---
21---Dela	8.0	7.5	7.0	7.0	---	4.0	5.5
22---Dela	7.0	6.5	6.0	6.0	---	---	---
23---Glenpool	6.0	---	---	5.5	6.5	2.0	3.5
24---Glenpool	6.0	---	---	5.5	6.5	---	---
25---Guyton	6.5	7.0	7.5	6.0	---	---	3.8
26*---Guyton	6.5	7.0	7.5	6.0	---	---	3.8
27---Hamden	9.0	8.0	7.0	8.0	---	---	4.1

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF PASTURE--Continued

Soil name and map symbol	Improved bermudagrass	Improved bermudagrass and tall fescue combination	Tall fescue	Bahiagrass	Weeping lovegrass	Sudangrass	Rye and ryegrass graze out
	AUM	AUM	AUM	AUM	AUM	AUM	AUM
28*---- Hollywood	5.5	---	---	5.5	---	---	---
30---- Kullit	8.0	7.5	7.5	7.0	---	3.6	4.1
31---- Larue	6.0	---	---	6.0	6.5	3.8	4.3
32---- Larue	6.0	---	---	6.0	6.5	3.8	4.3
33*---- Moyers	7.0	6.5	6.0	6.5	---	3.8	4.3
34*---- Moyers	6.5	6.0	6.0	6.0	---	3.6	4.1
35*---- Moyers	6.0	---	---	6.0	---	---	---
36---- Nahatche variant	9.0	9.0	9.0	8.0	---	---	---
37---- Pushmataha	12.0	11.0	10.0	9.0	---	4.0	4.3
38*---- Pushmataha	8.0	8.0	8.0	7.0	---	---	---
39---- Rexor	7.0	6.5	6.0	6.0	---	3.6	4.1
40---- Ruston	7.0	---	---	7.0	7.0	3.8	4.3
41---- Ruston	7.0	---	---	7.0	7.0	3.8	4.3
42---- Ruston	8.0	---	---	8.0	7.5	3.8	4.3
43---- Ruston	7.5	---	---	7.5	7.5	3.6	4.1
44---- Saffell	5.5	---	---	5.5	5.5	---	---
45---- Saffell	4.0	---	---	4.0	4.5	---	---
46---- Shermore	7.5	7.0	7.0	7.0	---	3.6	4.1
47---- Shermore	7.5	7.0	7.0	7.0	---	3.6	4.1

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF PASTURE--Continued

Soil name and map symbol	Improved bermudagrass	Improved bermudagrass and tall fescue combination	Tall fescue	Bahiagrass	Weeping lovegrass	Sudangrass	Rye and ryegrass graze out
	AUM	AUM	AUM	AUM	AUM	AUM	AUM
48---------- Shermore	6.5	6.0	6.0	6.0	---	3.0	3.8
49*---------- Sherwood	6.0	5.5	4.5	6.0	6.0	---	---
50*---------- Sherwood	5.5	5.0	4.0	5.5	5.5	---	---
51---------- Smithdale	5.5	---	---	5.0	5.5	---	---
52---------- Sobol	6.0	5.0	4.5	6.0	---	---	---
53*---------- Sobol	4.5	---	---	4.5	---	---	---
54---------- Speer	8.0	6.0	5.0	7.0	8.0	3.8	4.3
55*---------- Tuskahoma	4.0	---	---	4.0	---	---	---
57*---------- Wister	6.0	5.5	5.0	5.5	---	3.8	4.3
58*---------- Wister	6.0	5.5	5.0	5.5	---	3.6	4.1
59*---------- Wrightsville	7.5	7.0	7.0	7.0	---	3.2	3.8
60---------- Yanush	5.5	4.5	4.0	5.5	---	2.8	3.2
61---------- Yanush	5.0	4.0	3.5	5.0	---	---	---
62---------- Yanush	3.5	3.0	3.0	3.5	---	---	---

*See map unit description for composition and behavior characteristics of the map unit.

TABLE 6.--YIELDS PER ACRE OF CROPS

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Wheat	Grain sorghum	Soybeans	Peanuts
	Bu	Bu	Bu	Lb
1---------- Alikchi	20	30	20	---
2---------- Alikchi variant	25	35	25	---
3---------- Bernow	30	60	30	1,400
4---------- Bernow	25	55	25	1,300
9---------- Bosville	20	45	20	1,200
21---------- Dela	35	70	35	1,500
23---------- Glenpool	20	30	20	1,000
25---------- Guyton	20	30	20	---
26*---------- Guyton	25	35	25	---
27---------- Hamden	25	50	25	1,000
30---------- Kullit	25	50	25	1,000
31---------- Larue	25	45	25	1,200
32---------- Larue	20	40	20	1,000
33*---------- Moyers	30	55	30	1,000
34*---------- Moyers	30	50	30	800
37---------- Pushmataha	30	55	30	1,100
39---------- Rexor	35	70	35	1,500
40---------- Ruston	25	40	25	1,100
41---------- Ruston	20	35	20	1,000
42---------- Ruston	30	55	30	1,400

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Wheat	Grain sorghum	Soybeans	Peanuts
	Bu	Bu	Bu	Lb
43---------- Ruston	25	50	25	1,300
44---------- Saffell	25	50	25	900
46---------- Shermore	30	55	30	1,400
47---------- Shermore	25	50	25	1,300
48---------- Shermore	20	40	20	1,000
49*:				
Sherwood----------	20	50	20	1,200
Zafra----------	20	35	15	900
51---------- Smithdale	20	35	20	1,100
52---------- Sobol	20	35	20	---
54---------- Speer	30	60	30	1,400
57*---------- Wister	25	45	25	---
58*---------- Wister	25	45	25	---
59*---------- Wrightsville	25	35	25	---
60---------- Yanush	25	55	25	---
61---------- Yanush	20	45	20	---

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 7.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

[Only the soils that support rangeland vegetation suitable for grazing are listed]

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
3, 4---------- Bernow	Sandy Savannah----------	Favorable	4,200	Little bluestem----------	25
		Normal	3,000	Big bluestem----------	15
		Unfavorable	2,200	Indiangrass----------	10
				Switchgrass----------	5
5*:					
Bernow----------	Sandy Savannah----------	Favorable	4,200	Little bluestem----------	25
		Normal	3,000	Big bluestem----------	15
		Unfavorable	2,200	Indiangrass----------	10
				Switchgrass----------	5
Romia----------	Sandy Savannah----------	Favorable	4,200	Little bluestem----------	25
		Normal	3,000	Big bluestem----------	20
		Unfavorable	2,200	Indiangrass----------	5
				Switchgrass----------	5
6*:					
Bernow----------	Eroded Sandy Savannah---------	Favorable	2,800	Little bluestem----------	30
		Normal	2,100	Indiangrass----------	20
		Unfavorable	1,600		
Bosville----------	Eroded Sandy Savannah---------	Favorable	2,800	Little bluestem----------	30
		Normal	2,100	Indiangrass----------	20
		Unfavorable	1,600		
Romia----------	Eroded Sandy Savannah---------	Favorable	2,800	Little bluestem----------	30
		Normal	2,100	Indiangrass----------	20
		Unfavorable	1,600		
9, 10---------- Bosville	Sandy Savannah----------	Favorable	4,200	Little bluestem----------	25
		Normal	3,000	Big bluestem----------	15
		Unfavorable	2,200	Indiangrass----------	10
				Switchgrass----------	5
12*:					
Carnasaw----------	Sandy Savannah----------	Favorable	4,500	Little bluestem----------	25
		Normal	3,200	Big bluestem----------	15
		Unfavorable	2,500	Indiangrass----------	10
				Switchgrass----------	5
Pirum----------	Sandy Savannah----------	Favorable	4,500	Little bluestem----------	25
		Normal	3,200	Big bluestem----------	15
		Unfavorable	2,500	Indiangrass----------	10
				Switchgrass----------	5
Clebit----------	Shallow Savannah----------	Favorable	3,200	Little bluestem----------	35
		Normal	2,400	Big bluestem----------	5
		Unfavorable	1,800	Indiangrass----------	5
14*:					
Carnasaw----------	Sandy Savannah----------	Favorable	4,500	Little bluestem----------	25
		Normal	3,200	Big bluestem----------	15
		Unfavorable	2,500	Indiangrass----------	10
				Switchgrass----------	5
Stapp----------	Sandy Savannah----------	Favorable	5,000	Little bluestem----------	25
		Normal	3,500	Big bluestem----------	15
		Unfavorable	2,500	Indiangrass----------	10
				Switchgrass----------	5

See footnote at end of table.

TABLE 7.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
19*:					
Clebit	Savannah Breaks	Favorable	2,200	Little bluestem	40
		Normal	1,600	Big bluestem	5
		Unfavorable	1,200		
Pirum	Savannah Breaks	Favorable	3,500	Little bluestem	40
		Normal	2,400	Big bluestem	5
		Unfavorable	1,700		
Carnasaw	Savannah Breaks	Favorable	3,500	Little bluestem	40
		Normal	2,400	Big bluestem	5
		Unfavorable	1,700		
20*:					
Clebit	Savannah Breaks	Favorable	2,200	Little bluestem	40
		Normal	1,600	Big bluestem	5
		Unfavorable	1,200		
Rock outcrop.					
23, 24 Glenpool	Deep Sand Savannah	Favorable	4,000	Little bluestem	25
		Normal	2,800	Big bluestem	20
		Unfavorable	2,000	Indiangrass	10
				Switchgrass	5
27 Hamden	Sandy Savannah	Favorable	4,200	Little bluestem	25
		Normal	3,000	Big bluestem	15
		Unfavorable	2,200	Indiangrass	10
				Switchgrass	5
28*:					
Hollywood	Black Clay Prairie	Favorable	7,000	Little bluestem	40
		Normal	4,900	Indiangrass	15
		Unfavorable	3,500	Big bluestem	15
				Sideoats grama	5
				Texas needlegrass	5
				Silver bluestem	5
				Tall dropseed	5
Swink	Shallow Prairie	Favorable	3,600	Little bluestem	30
		Normal	2,500	Big bluestem	15
		Unfavorable	1,800	Indiangrass	10
				Switchgrass	10
				Tall dropseed	5
				Scribner panicum	5
				Sideoats grama	5
31, 32 Larue	Deep Sand Savannah	Favorable	4,500	Little bluestem	20
		Normal	3,000	Indiangrass	10
		Unfavorable	2,000	Longleaf uniola	10
				Switchgrass	10
				Purpletop	5
				Purple lovegrass	5
				Splitbeard bluestem	5
				Brownseed paspalum	5

See footnote at end of table.

TABLE 7.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
33*, 34*:					
Moyers	Loamy Prairie	Favorable	6,000	Big bluestem	35
		Normal	4,500	Switchgrass	15
		Unfavorable	3,500	Little bluestem	10
				Indiangrass	10
				Scribner panicum	5
				Tall dropseed	5
Burwell	Loamy Prairie	Favorable	7,000	Big bluestem	35
		Normal	5,200	Switchgrass	15
		Unfavorable	4,000	Little bluestem	10
				Indiangrass	10
				Scribner panicum	5
				Tall dropseed	5
35*:					
Moyers	Eroded Prairie	Favorable	3,000	Little bluestem	10
		Normal	2,100	Tall dropseed	10
		Unfavorable	1,500	Prairie-clover	5
				Maximilian sunflower	5
Wister	Eroded Prairie	Favorable	2,500	Little bluestem	10
		Normal	1,800	Tall dropseed	10
		Unfavorable	1,200	Prairie-clover	5
				Maximilian sunflower	5
Burwell	Eroded Prairie	Favorable	4,000	Little bluestem	10
		Normal	2,800	Tall dropseed	10
		Unfavorable	2,000	Prairie-clover	5
				Maximilian sunflower	5
52 Sobol	Loamy Prairie	Favorable	5,500	Big bluestem	35
		Normal	3,400	Switchgrass	15
		Unfavorable	2,000	Little bluestem	10
				Indiangrass	10
				Scribner panicum	5
				Tall dropseed	5
53*:					
Sobol	Loamy Prairie	Favorable	5,500	Big bluestem	35
		Normal	3,400	Switchgrass	15
		Unfavorable	2,000	Little bluestem	10
				Indiangrass	10
				Scribner panicum	5
				Tall dropseed	5
Tuskahoma	Shallow Savannah	Favorable	4,000	Little bluestem	30
		Normal	2,800	Big bluestem	20
		Unfavorable	2,000	Indiangrass	5
				Switchgrass	5
55*:					
Tuskahoma	Shallow Savannah	Favorable	4,000	Little bluestem	30
		Normal	2,800	Big bluestem	20
		Unfavorable	2,000	Indiangrass	5
				Switchgrass	5
Clebit	Shallow Savannah	Favorable	3,500	Little bluestem	25
		Normal	2,200	Big bluestem	15
		Unfavorable	1,900	Indiangrass	5
				Switchgrass	5
				Post oak	5
				Scribner panicum	5

See footnote at end of table.

TABLE 7.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
55*:					
Sobol	Loamy Prairie	Favorable	5,500	Big bluestem	35
		Normal	3,400	Switchgrass	15
		Unfavorable	2,000	Little bluestem	10
				Indiangrass	10
				Scribner panicum	5
				Tall dropseed	5
57*, 58*:					
Wister	Claypan Prairie	Favorable	5,000	Big bluestem	35
		Normal	3,500	Switchgrass	15
		Unfavorable	2,500	Little bluestem	10
				Indiangrass	10
				Scribner panicum	5
				Tall dropseed	5
Burwell	Loamy Prairie	Favorable	7,000	Big bluestem	35
		Normal	5,200	Switchgrass	15
		Unfavorable	4,000	Little bluestem	10
				Indiangrass	10
				Scribner panicum	5
				Tall dropseed	5

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available. Site index was calculated at age 30 for eastern cottonwood, at age 35 for American sycamore, and at age 50 for all other species]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
1---------- Alikchi	4w	Slight	Severe	Severe	Severe	Loblolly pine------- Shortleaf pine------	70 60	Loblolly pine, shortleaf pine.
2---------- Alikchi variant	3w	Slight	Severe	Severe	Severe	Loblolly pine------- Shortleaf pine------	80 70	Loblolly pine, shortleaf pine.
3, 4---------- Bernow	4o	Slight	Slight	Slight	Moderate	Southern red oak----	60	Loblolly pine, shortleaf pine, loblolly pine.
5*: Bernow----------	4o	Slight	Slight	Slight	Moderate	Southern red oak----	60	Loblolly pine, shortleaf pine, loblolly pine.
Romia----------	4o	Slight	Slight	Slight	Moderate	Southern red oak----	60	Shortleaf pine, loblolly pine.
6*: Bernow----------	5c	Severe	Moderate	Moderate	Moderate	Southern red oak----	60	Loblolly pine, shortleaf pine, loblolly pine.
Bosville----------	5c	Severe	Moderate	Moderate	Moderate	Southern red oak----	50	Shortleaf pine.
Romia----------	5c	Severe	Moderate	Moderate	Moderate	Southern red oak----	50	Shortleaf pine, loblolly pine.
7*: Bigfork----------	5f	Severe	Severe	Severe	Moderate	Shortleaf pine------	55	Shortleaf pine.
Yanush----------	5f	Severe	Severe	Severe	Moderate	Shortleaf pine------ Black walnut-------- Southern red oak----	60 --- ---	Shortleaf pine, loblolly pine.
8---------- Boggy	2w	Slight	Moderate	Slight	Moderate	Shortleaf pine------ Southern red oak---- Sweetgum---------- Red maple----------	80 80 90 ---	Loblolly pine, sweetgum, shortleaf pine.
9, 10---------- Bosville	4c	Slight	Moderate	Moderate	Moderate	Southern red oak---- Black oak----------	60 60	Shortleaf pine, loblolly pine.
11*: Carnasaw----------	3x	Moderate	Moderate	Severe	Moderate	Shortleaf pine------	70	Loblolly pine, shortleaf pine.
Pirum----------	3x	Moderate	Moderate	Moderate	Moderate	Loblolly pine------- Shortleaf pine------ Southern red oak---- White oak----------	--- --- --- ---	Loblolly pine, shortleaf pine, southern red oak.
Clebit----------	5x	Moderate	Moderate	Moderate	Moderate	Shortleaf pine------ Eastern redcedar----	40 30	Shortleaf pine, eastern redcedar.
12*: Carnasaw----------	4x	Moderate	Moderate	Severe	Moderate	Shortleaf pine------	60	Loblolly pine, shortleaf pine.
Pirum----------	4x	Moderate	Moderate	Moderate	Moderate	Shortleaf pine------	60	Loblolly pine, shortleaf pine.
Clebit----------	5x	Moderate	Moderate	Moderate	Moderate	Shortleaf pine------ Eastern redcedar----	40 30	Shortleaf pine, eastern redcedar.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
13*:								
Carnasaw	3x	Slight	Moderate	Severe	Moderate	Shortleaf pine	70	Loblolly pine, shortleaf pine.
Stapp	3x	Slight	Moderate	Severe	Moderate	Shortleaf pine	70	Loblolly pine, shortleaf pine.
14*:								
Carnasaw	4x	Slight	Moderate	Severe	Moderate	Shortleaf pine	60	Loblolly pine, shortleaf pine.
Stapp	4x	Slight	Moderate	Severe	Moderate	Shortleaf pine	60	Loblolly pine, shortleaf pine.
15, 16 Ceda	3f	Slight	Severe	Moderate	Moderate	Shortleaf pine Southern red oak White oak Sweetgum American sycamore	70 --- --- 80 80	Loblolly pine, shortleaf pine, American sycamore, sweetgum.
17*:								
Ceda	3f	Slight	Severe	Moderate	Moderate	Shortleaf pine Southern red oak White oak Sweetgum American sycamore	70 --- --- 80 80	Loblolly pine, shortleaf pine, American sycamore, sweetgum.
Rubble land.								
18*:								
Clebit	5x	Severe	Severe	Severe	Severe	Shortleaf pine Eastern redcedar	40 30	Shortleaf pine, eastern redcedar.
Pirum	3x	Severe	Severe	Severe	Moderate	Shortleaf pine	70	Loblolly pine, shortleaf pine.
Carnasaw	3x	Severe	Severe	Severe	Moderate	Shortleaf pine	70	Loblolly pine, shortleaf pine.
19*:								
Clebit	5x	Severe	Severe	Severe	Severe	Shortleaf pine Eastern redcedar	40 30	Shortleaf pine, eastern redcedar.
Pirum	4x	Severe	Severe	Severe	Moderate	Shortleaf pine	60	Loblolly pine, shortleaf pine.
Carnasaw	4x	Severe	Severe	Severe	Moderate	Shortleaf pine	60	Loblolly pine, shortleaf pine.
20*:								
Clebit	5x	Severe	Severe	Severe	Severe	Shortleaf pine Eastern redcedar	40 30	Shortleaf pine, eastern redcedar.
Rock outcrop.								
21, 22 Dela	2o	Slight	Slight	Slight	Severe	Southern red oak Sweetgum Eastern cottonwood Shortleaf pine	80 90 100 80	Loblolly pine, shortleaf pine, black walnut, southern red oak.
23, 24 Glenpool	4s	Slight	Slight	Severe	Moderate	Southern red oak	60	Shortleaf pine, southern red oak.
25 Guyton	2w	Slight	Severe	Moderate	Moderate	Loblolly pine Slash pine Sweetgum Green ash Southern red oak Water oak	90 90 --- --- --- ---	Loblolly pine, sweetgum.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
26*:								
Guyton	2w	Slight	Severe	Moderate	Moderate	Loblolly pine	90	Loblolly pine, sweetgum.
						Slash pine	90	
						Sweetgum	---	
						Green ash	---	
						Southern red oak	---	
						Water oak	---	
Elysian	2o	Slight	Slight	Slight	Slight	Loblolly pine	90	Loblolly pine, sweetgum, cherrybark oak, black walnut, American sycamore.
						Shortleaf pine	80	
						Sweetgum	---	
						Southern red oak	---	
27--- Hamden	3w	Slight	Slight	Slight	Moderate	Southern red oak	70	Loblolly pine, sweetgum, cherrybark oak.
						White oak	---	
						Sweetgum	---	
						Shortleaf pine	70	
29*:								
Honobia	4x	Slight	Moderate	Moderate	Moderate	Shortleaf pine	60	Shortleaf pine, loblolly pine.
						Post oak	---	
Nashoba	4x	Slight	Moderate	Moderate	Moderate	Shortleaf pine	65	Shortleaf pine, loblolly pine.
						Post oak	---	
30--- Kullit	2w	Slight	Moderate	Slight	Moderate	Loblolly pine	90	Loblolly pine, sweetgum, cherrybark oak.
						Southern red oak	---	
						White oak	---	
						Sweetgum	---	
31, 32--- Larue	4s	Slight	Moderate	Moderate	Moderate	Loblolly pine	80	Loblolly pine, shortleaf pine.
						Shortleaf pine	70	
						Longleaf pine	70	
						Southern red oak	---	
						Sweetgum	---	
36--- Nahatche variant	2w	Slight	Moderate	Moderate	Moderate	Shortleaf pine	80	Loblolly pine, shortleaf pine.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
37---------- Pushmataha	2w	Slight	Moderate	Moderate	Moderate	Shortleaf pine------ Southern red oak---- Sweetgum----------	80 80 90	Loblolly pine, sweetgum, water oak, green ash.
38*: Pushmataha--------	2w	Slight	Moderate	Moderate	Moderate	Shortleaf pine------ Southern red oak---- Sweetgum----------	80 80 90	Loblolly pine, sweetgum, water oak, green ash.
Elysian----------	2o	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Sweetgum---------- Southern red oak----	90 80 --- ---	Loblolly pine, sweetgum, cherrybark oak, black walnut, American sycamore.
Guyton----------	2w	Slight	Severe	Moderate	Moderate	Loblolly pine------- Slash pine---------- Sweetgum---------- Green ash---------- Southern red oak---- Water oak----------	90 90 --- --- --- ---	Loblolly pine, sweetgum.
39---------- Rexor	2o	Slight	Slight	Slight	Moderate	Loblolly pine------- Southern red oak----	90 80	Loblolly pine.
40, 41, 42, 43----- Ruston	3o	Slight	Slight	Slight	Moderate	Loblolly pine------- Shortleaf pine------	84 75	Loblolly pine.
44, 45---------- Saffell	4f	Slight	Slight	Moderate	Moderate	Loblolly pine------- Shortleaf pine------ Eastern redcedar----	70 60 ---	Loblolly pine, shortleaf pine, eastern redcedar.
46, 47, 48--------- Shermore	3o	Slight	Slight	Slight	Moderate	Shortleaf pine------ Southern red oak----	70 70	Loblolly pine, shortleaf pine.
49*, 50*: Sherwood----------	3o	Slight	Slight	Slight	Moderate	Shortleaf pine------ Southern red oak---- White oak---------- Sweetgum----------	70 60 55 60	Shortleaf pine, southern red oak.
Zafra----------	3o	Slight	Slight	Slight	Moderate	Shortleaf pine------ Southern red oak----	70 70	Shortleaf pine.
51---------- Smithdale	3o	Slight	Slight	Slight	Moderate	Shortleaf pine------	75	Loblolly pine, shortleaf pine.
53*: Sobol.								
Tuskahoma---------	5d	Moderate	Moderate	Moderate	Moderate	Shortleaf pine------ Eastern redcedar----	50 30	Shortleaf pine, eastern redcedar.
54---------- Speer	2o	Slight	Slight	Slight	Severe	Southern red oak---- Sweetgum---------- Shortleaf pine------	80 90 80	Loblolly pine, shortleaf pine, black walnut, southern red oak.
55*: Tuskahoma---------	5d	Moderate	Moderate	Moderate	Moderate	Shortleaf pine------ Eastern redcedar----	50 30	Shortleaf pine, eastern redcedar.
Clebit----------	5d	Moderate	Moderate	Moderate	Moderate	Shortleaf pine------ Eastern redcedar----	40 30	Shortleaf pine, eastern redcedar.
Sobol.								

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
59*: Wrightsville	3w	Slight	Severe	Moderate	Moderate	Loblolly pine Sweetgum Water oak	80 80 80	Loblolly pine, sweetgum, water oak, willow oak.
Elysian	2o	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Sweetgum Southern red oak	90 80 --- ---	Loblolly pine, sweetgum, cherrybark oak, black walnut, American sycamore.
60, 61 Yanush	4f	Slight	Moderate	Slight	Slight	Shortleaf pine Black walnut Southern red oak	60 --- ---	Shortleaf pine, loblolly pine.
62 Yanush	5f	Severe	Severe	Severe	Moderate	Shortleaf pine Black walnut Southern red oak	60 --- ---	Shortleaf pine, loblolly pine.

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 9.--WOODLAND UNDERSTORY VEGETATION

[Only the soils suitable for production of commercial trees are listed]

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
1----------	Favorable	1,300	Sedge----------	20
Alikchi	Normal	1,000	Panicum----------	15
	Unfavorable	600	Broadleaf uniola----------	10
			Little bluestem----------	5
2----------	Favorable	1,500	Sedge----------	20
Alikchi variant	Normal	1,100	Panicum----------	15
	Unfavorable	700	Broadleaf uniola----------	10
			Little bluestem----------	5
3, 4----------	Favorable	2,100	Little bluestem----------	15
Bernow	Normal	1,500	Big bluestem----------	10
	Unfavorable	1,100	Indiangrass----------	5
			Switchgrass----------	5
5*:				
Bernow----------	Favorable	2,100	Little bluestem----------	15
	Normal	1,500	Big bluestem----------	10
	Unfavorable	1,100	Indiangrass----------	5
			Switchgrass----------	5
Romia----------	Favorable	2,100	Little bluestem----------	15
	Normal	1,500	Big bluestem----------	10
	Unfavorable	1,100	Indiangrass----------	5
			Switchgrass----------	5
6*:				
Bernow----------	Favorable	2,100	Little bluestem----------	15
	Normal	1,500	Big bluestem----------	10
	Unfavorable	1,100	Indiangrass----------	5
			Switchgrass----------	5
Bosville----------	Favorable	2,300	Little bluestem----------	15
	Normal	1,700	Big bluestem----------	10
	Unfavorable	1,300	Indiangrass----------	5
			Switchgrass----------	
Romia----------	Favorable	2,100	Little bluestem----------	15
	Normal	1,500	Big bluestem----------	10
	Unfavorable	1,100	Indiangrass----------	5
			Switchgrass----------	5
7*:				
Bigfork----------	Favorable	2,000	Little bluestem----------	35
	Normal	1,400	Big bluestem----------	10
	Unfavorable	1,000	Beaked panicum----------	10
			Scribner panicum----------	10
Yanush----------	Favorable	3,000	Little bluestem----------	20
	Normal	2,100	Big bluestem----------	10
	Unfavorable	1,500	Beaked panicum----------	10
			Scribner panicum----------	10
8----------	Favorable	3,000	Little bluestem----------	10
Boggy	Normal	2,100	Wildrye----------	10
	Unfavorable	1,600	Uniola----------	10
			Giant cane----------	10
			Switchgrass----------	5
			Big bluestem----------	5
			Beaked panicum----------	5
			Sedge----------	5
9, 10----------	Favorable	2,300	Little bluestem----------	15
Bosville	Normal	1,700	Big bluestem----------	10
	Unfavorable	1,300	Indiangrass----------	5
			Switchgrass----------	5

See footnote at end of table.

TABLE 9.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
11*:				
Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400		
Pirum	Favorable	2,500	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,000	Indiangrass	5
			Switchgrass	5
Clebit	Favorable	1,400	Little bluestem	20
	Normal	900	Big bluestem	5
	Unfavorable	600		
12*:				
Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400		
Pirum	Favorable	2,500	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,000	Indiangrass	5
			Switchgrass	5
Clebit	Favorable	1,400	Little bluestem	20
	Normal	900	Big bluestem	5
	Unfavorable	600		
13*, 14*:				
Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400		
Stapp	Favorable	2,800	Beaked panicum	15
	Normal	2,000	Little bluestem	15
	Unfavorable	1,400	Big bluestem	5
			Greenbrier	5
			Switchgrass	5
			Florida paspalum	5
			Canada wildrye	5
15, 16	Favorable	1,600	Beaked panicum	20
Ceda	Normal	1,100	Panicum	15
	Unfavorable	800	Sedge	15
			Switchgrass	10
			Little bluestem	5
17*:				
Ceda	Favorable	1,600	Beaked panicum	20
	Normal	1,100	Panicum	15
	Unfavorable	800	Sedge	15
			Switchgrass	10
			Little bluestem	5
18*:				
Clebit	Favorable	1,400	Little bluestem	20
	Normal	900	Big bluestem	5
	Unfavorable	600		
Pirum	Favorable	2,500	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,000	Indiangrass	5
			Switchgrass	5
Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400		

See footnote at end of table.

TABLE 9.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
19*:				
Clebit	Favorable	1,400	Little bluestem	20
	Normal	900	Big bluestem	5
	Unfavorable	600		
Pirum	Favorable	2,500	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,000	Indiangrass	5
			Switchgrass	5
Carnasaw	Favorable	2,400	Little bluestem	15
	Normal	1,800	Big bluestem	10
	Unfavorable	1,400		
20*:				
Clebit	Favorable	1,400	Little bluestem	20
	Normal	900	Big bluestem	5
	Unfavorable	600		
21, 22	Favorable	4,000	Little bluestem	15
Dela	Normal	3,100	Sedge	10
	Unfavorable	2,500	Panicum	10
			Big bluestem	5
			Indiangrass	5
23, 24	Favorable	2,500	Little bluestem	15
Glenpool	Normal	1,600	Big bluestem	10
	Unfavorable	1,000	Scribner panicum	5
			Purpletop	5
			Beaked panicum	5
25	Favorable	2,600	Little bluestem	50
Guyton	Normal	1,800	Big bluestem	15
	Unfavorable	1,300	Giant cane	15
26*:				
Guyton	Favorable	2,600	Little bluestem	50
	Normal	1,800	Big bluestem	15
	Unfavorable	1,300	Giant cane	15
Elysian	Favorable	3,450	Little bluestem	15
	Normal	2,600	Panicum	10
	Unfavorable	2,000	Big bluestem	5
			Indiangrass	5
			Broadleaf uniola	5
			Sedge	5
27	Favorable	2,100	Little bluestem	15
Hamden	Normal	1,500	Big bluestem	10
	Unfavorable	1,100	Indiangrass	5
			Switchgrass	5
29*:				
Honobia	Favorable	2,500	Little bluestem	30
	Normal	1,700	Big bluestem	10
	Unfavorable	1,200	Indiangrass	5
			Scribner panicum	5
			Post oak	5
Nashoba	Favorable	2,700	Little bluestem	35
	Normal	1,900	Big bluestem	10
	Unfavorable	1,400	Beaked panicum	10
			Scribner panicum	10

See footnote at end of table.

TABLE 9.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
30---------- Kullit	Favorable	2,500	Beaked panicum----------	10
	Normal	2,000	Sedge----------	10
	Unfavorable	1,600	Switchgrass----------	10
			Canada wildrye----------	10
			Greenbrier----------	10
			Broadleaf uniola----------	5
31, 32---------- Larue	Favorable	4,500	Little bluestem----------	20
	Normal	3,000	Indiangrass----------	10
	Unfavorable	2,000	Longleaf uniola----------	10
			Switchgrass----------	10
			Purpletop----------	5
			Purple lovegrass----------	5
			Splitbeard bluestem----------	5
			Brownseed paspalum----------	5
36---------- Nahatche variant	Favorable	3,000	Little bluestem----------	10
	Normal	2,100	Wildrye----------	10
	Unfavorable	1,600	Uniola----------	10
			Giant cane----------	10
			Switchgrass----------	5
			Beaked panicum----------	5
			Sedge----------	5
			Big bluestem----------	5
37---------- Pushmataha	Favorable	3,000	Little bluestem----------	10
	Normal	2,100	Wildrye----------	10
	Unfavorable	1,600	Uniola----------	10
			Giant cane----------	10
			Switchgrass----------	5
			Big bluestem----------	5
			Beaked panicum----------	5
			Sedge----------	5
38*:				
Pushmataha--------	Favorable	3,000	Little bluestem----------	10
	Normal	2,100	Wildrye----------	10
	Unfavorable	1,600	Uniola----------	10
			Giant cane----------	10
			Switchgrass----------	5
			Big bluestem----------	5
			Beaked panicum----------	5
			Sedge----------	5

See footnote at end of table.

TABLE 9.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
38*:				
Elysian	Favorable	3,450	Little bluestem	15
	Normal	2,600	Panicum	10
	Unfavorable	2,000	Big bluestem	5
			Indiangrass	5
			Broadleaf uniola	5
			Sedge	5
Guyton	Favorable	2,600	Pinehill bluestem	50
	Normal	1,800	Chalky bluestem	15
	Unfavorable	1,300	Silver plumegrass	15
39	Favorable	5,000	Little bluestem	15
Rexor	Normal	3,500	Big bluestem	10
	Unfavorable	2,500	Switchgrass	10
			Panicum	5
			Eastern gamagrass	5
			Sedge	5
			Indiangrass	5
			Uniola	5
40, 41, 42, 43	Favorable	1,700	Longleaf uniola	50
Ruston	Normal	1,200	Little bluestem	15
	Unfavorable	700	Beaked panicum	10
			Panicum	10
44, 45	Favorable	1,500	Bluestem	20
Saffell	Normal	1,000	Uniola	15
	Unfavorable	500	Virginia wildrye	10
			Beaked panicum	10
			Indiangrass	5
			Panicum	5
			Sedge	5
46, 47, 48	Favorable	2,200	Little bluestem	25
Shermore	Normal	1,600	Big bluestem	10
	Unfavorable	1,200	Beaked panicum	10
			Scribner panicum	10
			Shortleaf pine	5
			Southern red oak	5
			Post oak	5
49*, 50*:				
Sherwood	Favorable	2,000	Little bluestem	35
	Normal	1,400	Big bluestem	10
	Unfavorable	1,000	Beaked panicum	10
			Scribner panicum	10
Zafra	Favorable	2,000	Little bluestem	35
	Normal	1,400	Big bluestem	10
	Unfavorable	1,000	Beaked panicum	10
			Scribner panicum	10
51	Favorable	1,700	Little bluestem	15
Smithdale	Normal	1,200	Beaked panicum	10
	Unfavorable	700		

See footnote at end of table.

TABLE 9.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
53*:				
Tuskahoma	Favorable	1,400	Little bluestem	20
	Normal	900	Big bluestem	10
	Unfavorable	600	Indiangrass	5
			Switchgrass	5
54	Favorable	4,000	Little bluestem	15
Speer	Normal	3,100	Sedge	10
	Unfavorable	2,500	Panicum	10
			Big bluestem	5
			Indiangrass	5
			Post oak	5
			Southern red oak	5
			Shortleaf pine	5
			White oak	5
			Sweetgum	5
55*:				
Tuskahoma	Favorable	1,400	Little bluestem	20
	Normal	900	Big bluestem	10
	Unfavorable	600	Indiangrass	5
			Switchgrass	5
Clebit	Favorable	1,600	Little bluestem	15
	Normal	1,100	Big bluestem	10
	Unfavorable	800	Post oak	5
			Scribner panicum	5
59*:				
Wrightsville	Favorable	3,000	Plumegrass	15
	Normal	2,000	Switchgrass	10
	Unfavorable	1,250	Beaked panicum	10
			Uniola	10
			Paspalum	5
			Panicum	5
			Velvet panicum	5
			Sedge	5
			Blueberry	5
Elysian	Favorable	3,450	Little bluestem	15
	Normal	2,600	Panicum	10
	Unfavorable	2,000	Big bluestem	5
			Indiangrass	5
			Broadleaf uniola	5
			Sedge	5
60, 61, 62	Favorable	3,000	Little bluestem	20
Yanush	Normal	2,100	Big bluestem	10
	Unfavorable	1,500	Beaked panicum	10
			Scribner panicum	10

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1 Alikchi	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
2 Alikchi variant	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.
3 Bernow	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.
4 Bernow	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, shrink-swell.
5*: Bernow	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Moderate: low strength, shrink-swell, slope.
Romia	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.
6*: Bernow	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, shrink-swell.
Bosville	Severe: too clayey, wetness.	Severe: shrink-swell, low strength, wetness.	Severe: shrink-swell, low strength, wetness.	Severe: low strength, wetness, shrink-swell.	Severe: low strength, shrink-swell.
Romia	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.
7*: Bigfork	Severe: slope, large stones, depth to rock.	Severe: slope, large stones.	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.
Yanush	Severe: small stones, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
8 Boggy	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
9 Bosville	Severe: too clayey, wetness.	Severe: shrink-swell, low strength, wetness.	Severe: shrink-swell, low strength, wetness.	Severe: low strength, wetness, shrink-swell.	Severe: low strength, shrink-swell.
10 Bosville	Severe: too clayey, wetness.	Severe: shrink-swell, low strength, wetness.	Severe: shrink-swell, low strength, wetness.	Severe: shrink-swell, slope, wetness.	Severe: low strength, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
11*, 12*:					
Carnasaw	Severe: too clayey, slope.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, low strength, slope.
Pirum	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Clebit	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.
13*, 14*:					
Carnasaw	Severe: too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.
Stapp	Severe: too clayey, wetness.	Severe: low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.
15, 16 Ceda	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
17*:					
Ceda	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Rubble land.					
18*, 19*:					
Clebit	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.
Pirum	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Carnasaw	Severe: too clayey, slope.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, low strength, slope.
20*:					
Clebit	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.
Rock outcrop.					
21, 22 Dela	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
23 Glenpool	Severe: too sandy, cutbanks cave.	Slight	Slight	Slight	Slight.
24 Glenpool	Severe: too sandy, cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
25--- Guyton	Severe: floods, wetness, cutbanks cave.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
26*: Guyton	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Elysian	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Moderate: low strength.
27--- Hamden	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: low strength, shrink-swell.
28*: Hollywood	Severe: too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.
Swink	Severe: too clayey, depth to rock.	Severe: low strength, shrink-swell, depth to rock.	Severe: shrink-swell, low strength, depth to rock.	Severe: low strength, shrink-swell, depth to rock.	Severe: depth to rock, low strength, shrink-swell.
29*: Honobia	Severe: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: shrink-swell.
Nashoba	Severe: depth to rock.	Moderate: large stones, depth to rock, slope.	Severe: depth to rock.	Severe: slope.	Moderate: slope, large stones, depth to rock.
30--- Kullit	Moderate: wetness, too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.	Severe: low strength.
31--- Larue	Slight	Slight	Slight	Slight	Slight.
32--- Larue	Slight	Slight	Slight	Moderate: slope.	Slight.
33*, 34*: Moyers	Severe: wetness, too clayey.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: low strength, shrink-swell.
Burwell	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
35*: Moyers	Severe: wetness, too clayey.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: low strength, shrink-swell.
Wister	Severe: wetness, too clayey.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
35*: Burwell	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
36--- Nahatche variant	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
37--- Pushmataha	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: floods, wetness.
38*: Pushmataha	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: floods, wetness.
Elysian	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Moderate: low strength.
Guyton	Severe: floods, wetness, cutbanks cave.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
39--- Rexor	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods, low strength, shrink-swell.
40--- Ruston	Slight	Slight	Slight	Slight	Moderate: low strength.
41--- Ruston	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.
42--- Ruston	Slight	Slight	Slight	Slight	Moderate: low strength.
43--- Ruston	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.
44--- Saffell	Severe: small stones.	Slight	Slight	Moderate: slope.	Slight.
45--- Saffell	Severe: slope, small stones.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
46, 47, 48--- Shermore	Severe: wetness.	Moderate: wetness, low strength.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, low strength.
49*: Sherwood	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight.
Zafra	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Moderate: depth to rock.
50*: Sherwood	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.
Zafra	Moderate: depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: depth to rock.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
51---------- Smithdale	Slight----------	Slight----------	Slight----------	Moderate: slope.	Slight.
52---------- Sobol	Severe: wetness, too clayey.	Severe: low strength, wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: low strength, shrink-swell.
53*: Sobol----------	Severe: wetness, too clayey.	Severe: low strength, wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: slope, low strength, shrink-swell.	Severe: low strength, shrink-swell.
Tuskahoma--------	Severe: wetness, too clayey.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell, low strength.	Severe: slope, wetness, shrink-swell.	Severe: low strength, shrink-swell.
54---------- Speer	Moderate: too clayey, floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: low strength, floods.
55*: Tuskahoma--------	Severe: wetness, too clayey.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell, low strength.	Severe: slope, wetness, shrink-swell.	Severe: low strength, shrink-swell.
Clebit----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.
Sobol----------	Severe: wetness, too clayey.	Severe: low strength, wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: slope, low strength, shrink-swell.	Severe: low strength, shrink-swell.
56*. Udorthents					
57*, 58*: Wister----------	Severe: wetness, too clayey.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.
Burwell----------	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
59*: Wrightsville-----	Severe: wetness, too clayey.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.
Elysian----------	Moderate: wetness.	Slight----------	Moderate: wetness.	Slight----------	Moderate: low strength.
60---------- Yanush	Severe: small stones.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.
61---------- Yanush	Severe: small stones.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Moderate: shrink-swell.
62---------- Yanush	Severe: small stones.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, shrink-swell.

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1 Alikchi	Severe: percs slowly, wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: wetness.	Poor: wetness.
2 Alikchi variant	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Poor: wetness.
3 Bernow	Slight	Moderate: seepage.	Slight	Slight	Good.
4 Bernow	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
5*: Bernow	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.
Romia	Moderate: percs slowly, depth to rock, slope.	Severe: slope.	Moderate: depth to rock.	Moderate: slope.	Fair: too clayey, slope.
6*: Bernow	Slight	Severe: slope.	Slight	Slight	Good.
Bosville	Severe: percs slowly, wetness.	Severe: wetness, slope.	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey.
Romia	Moderate: percs slowly, depth to rock, slope.	Severe: slope.	Moderate: depth to rock.	Moderate: slope.	Fair: too clayey, slope.
7*: Bigfork	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, small stones.	Severe: large stones, slope, depth to rock.	Severe: slope.	Poor: small stones, slope, large stones.
Yanush	Severe: slope.	Severe: small stones, slope.	Severe: small stones.	Severe: slope.	Poor: small stones, slope.
8 Boggy	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
9 Bosville	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey.
10 Bosville	Severe: percs slowly, wetness.	Severe: wetness, slope.	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
11*, 12*:					
Carnasaw	Severe: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: too clayey, slope.
Pirum	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Poor: slope.
Clebit	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: seepage, depth to rock, large stones.	Severe: seepage, slope.	Poor: thin layer, slope, large stones.
13*, 14*:					
Carnasaw	Severe: percs slowly.	Moderate: depth to rock, slope, large stones.	Severe: too clayey.	Slight	Poor: too clayey.
Stapp	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness, too clayey, depth to rock.	Moderate: wetness.	Poor: too clayey.
15, 16 Ceda	Severe: floods.	Severe: seepage, small stones, floods.	Severe: floods, seepage.	Severe: floods, seepage.	Poor: small stones.
17*:					
Ceda	Severe: floods.	Severe: seepage, small stones, floods.	Severe: floods, seepage.	Severe: floods, seepage.	Poor: small stones.
Rubble land.					
18*, 19*:					
Clebit	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones, slope.	Severe: seepage, slope.	Poor: thin layer, slope, large stones.
Pirum	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Carnasaw	Severe: percs slowly, slope.	Severe: slope.	Severe: too clayey, slope.	Severe: slope.	Poor: too clayey, slope.
20*:					
Clebit	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones, slope.	Severe: seepage, slope.	Poor: thin layer, slope, large stones.
Rock outcrop.					
21, 22 Dela	Severe: wetness, floods.	Severe: seepage, floods.	Severe: wetness, floods, seepage.	Severe: floods, seepage.	Good.
23 Glenpool	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
24--Glenpool	Slight	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
25--Guyton	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
26*:					
Guyton	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Elysian	Severe: wetness.	Moderate: seepage.	Slight	Moderate: wetness.	Good.
27--Hamden	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
28*:					
Hollywood	Severe: percs slowly.	Moderate: slope.	Severe: too clayey, depth to rock.	Slight	Poor: too clayey.
Swink	Severe: percs slowly, depth to rock.	Severe: depth to rock.	Severe: too clayey, depth to rock.	Slight	Poor: too clayey, thin layer.
29*:					
Honobia	Severe: percs slowly, depth to rock.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope.	Poor: too clayey, thin layer, area reclaim.
Nashoba	Severe: depth to rock.	Severe: depth to rock, slope, seepage.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: thin layer, area reclaim.
30--Kullit	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
31, 32--Larue	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: too sandy.
33*, 34*:					
Moyers	Severe: percs slowly, wetness, depth to rock.	Severe: wetness.	Severe: wetness, too clayey, depth to rock.	Severe: wetness.	Poor: too clayey.
Burwell	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: too clayey, wetness.	Moderate: wetness.	Fair: too clayey.
35*:					
Moyers	Severe: percs slowly, wetness, depth to rock.	Severe: wetness.	Severe: wetness, too clayey, depth to rock.	Severe: wetness.	Poor: too clayey.
Wister	Severe: percs slowly.	Moderate: depth to rock.	Severe: too clayey.	Severe: wetness.	Poor: thin layer.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
35*:					
Burwell	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: too clayey, wetness.	Moderate: wetness.	Fair: too clayey.
36 Nahatche variant	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
37 Pushmataha	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
38*:					
Pushmataha	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
Elysian	Severe: wetness.	Moderate: seepage.	Slight	Moderate: wetness.	Good.
Guyton	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
39 Rexor	Severe: floods.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Fair: too clayey.
40 Ruston	Slight	Moderate: seepage.	Slight	Slight	Good.
41, 42, 43 Ruston	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
44 Saffell	Slight	Moderate: slope, seepage.	Slight	Slight	Poor: small stones.
45 Saffell	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope, small stones.
46, 47, 48 Shermore	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Good.
49*:					
Sherwood	Moderate: percs slowly, depth to rock.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Slight	Fair: thin layer, area reclaim.
Zafra	Severe: depth to rock.	Moderate: seepage, depth to rock.	Severe: depth to rock.	Slight	Poor: small stones.
50*:					
Sherwood	Moderate: percs slowly, slope, depth to rock.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Poor: slope, thin layer, area reclaim.
Zafra	Severe: depth to rock.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Poor: small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
51---------- Smithdale	Slight----------	Severe: seepage, slope.	Slight----------	Slight----------	Good.
52---------- Sobol	Severe: depth to rock, wetness, percs slowly.	Severe: wetness, depth to rock.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, thin layer.
53*: Sobol----------	Severe: depth to rock, wetness, percs slowly.	Severe: slope, wetness, depth to rock.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, thin layer.
Tuskahoma----------	Severe: percs slowly, wetness.	Severe: wetness, depth to rock, slope.	Severe: too clayey.	Severe: wetness.	Poor: too clayey, thin layer.
54---------- Speer	Moderate: floods, percs slowly.	Severe: floods.	Moderate: floods, too clayey.	Moderate: floods.	Fair: too clayey.
55*: Tuskahoma----------	Severe: percs slowly, wetness.	Severe: wetness, depth to rock, slope.	Severe: too clayey.	Severe: wetness.	Poor: too clayey, thin layer.
Clebit----------	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: seepage, small stones, depth to rock.	Severe: seepage.	Poor: thin layer, small stones.
Sobol----------	Severe: depth to rock, wetness, percs slowly.	Severe: slope, wetness, depth to rock.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, thin layer.
56*. Udorthents					
57*, 58*: Wister----------	Severe: percs slowly.	Moderate: depth to rock.	Severe: too clayey.	Severe: wetness.	Poor: thin layer.
Burwell----------	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: too clayey, wetness.	Moderate: wetness.	Fair: too clayey.
59*: Wrightsville-------	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey.
Elysian----------	Severe: wetness.	Moderate: seepage.	Slight----------	Moderate: wetness.	Good.
60, 61---------- Yanush	Slight----------	Severe: small stones.	Severe: small stones.	Slight----------	Poor: small stones.
62---------- Yanush	Moderate: slope.	Severe: small stones, slope.	Severe: small stones.	Moderate: slope.	Poor: small stones.

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1---------- Alikchi	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
2---------- Alikchi variant	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
3, 4---------- Bernow	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, slope.
5*: Bernow----------	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, slope.
Romia----------	Fair: low strength, thin layer, area reclaim.	Poor: excess fines.	Poor: excess fines.	Fair: slope.
6*: Bernow----------	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, slope.
Bosville----------	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
Romia----------	Fair: low strength, thin layer, area reclaim.	Poor: excess fines.	Poor: excess fines.	Fair: slope.
7*: Bigfork----------	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones, thin layer.
Yanush----------	Fair: slope, shrink-swell.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones, slope.
8---------- Boggy	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
9, 10---------- Bosville	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
11*, 12*: Carnasaw----------	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
Pirum----------	Fair: low strength, slope, large stones.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
11*, 12*: Clebit	Poor: thin layer, large stones.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, slope, large stones.
13*, 14*: Carnasaw	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
Stapp	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, large stones.
15, 16 Ceda	Good	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
17*: Ceda	Good	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
Rubble land.				
18*, 19*: Clebit	Poor: slope, thin layer, large stones.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, slope, large stones.
Pirum	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
Carnasaw	Poor: shrink-swell, low strength, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, large stones.
20*: Clebit	Poor: slope, thin layer, large stones.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, slope, large stones.
Rock outcrop.				
21, 22 Dela	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
23, 24 Glenpool	Good	Poor: excess fines.	Unsuited: excess fines.	Poor: too sandy.
25 Guyton	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
26*: Guyton	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Elysian	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
27 Hamden	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
28*:				
Hollywood	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
Swink	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
29*:				
Honobia	Poor: shrink-swell, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones, small stones.
Nashoba	Poor: thin layer, area reclaim.	Poor: excess fines, thin layer.	Poor: excess fines, thin layer.	Poor: thin layer.
30--- Kullit	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
31, 32--- Larue	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Fair: too sandy.
33*, 34*:				
Moyers	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Burwell	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
35*:				
Moyers	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Wister	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Burwell	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
36--- Nahatche variant	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
37--- Pushmataha	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
38*:				
Pushmataha	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Elysian	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Guyton	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
39--- Rexor	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
40, 41--- Ruston	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too sandy.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
42, 43---------- Ruston	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
44---------- Saffell	Good----------	Poor: excess fines.	Fair: excess fines.	Poor: small stones.
45---------- Saffell	Fair: slope.	Poor: excess fines.	Fair: excess fines.	Poor: slope, small stones.
46, 47, 48---------- Shermore	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
49*, 50*: Sherwood----------	Fair: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Zafra----------	Fair: thin layer.	Unsuited: excess fines.	Poor: excess fines.	Fair: thin layer, small stones.
51---------- Smithdale	Good----------	Unsuited: excess fines.	Unsuited: excess fines.	Good.
52---------- Sobol	Poor: shrink-swell, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
53*: Sobol----------	Poor: shrink-swell, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
Tuskahoma----------	Poor: shrink-swell, low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
54---------- Speer	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
55*: Tuskahoma----------	Poor: shrink-swell, low strength, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
Clebit----------	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Sobol----------	Poor: shrink-swell, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
56*. Udorthents				
57*, 58*: Wister----------	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
57*, 58*:				
Burwell	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
59*:				
Wrightsville	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Elysian	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
60, 61, 62--- Yanush	Fair: shrink-swell.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
1---------- Alikchi	Moderate: depth to rock.	Severe: wetness.	Severe: slow refill.	Percs slowly, depth to rock.	Percs slowly, wetness, erodes easily.	Wetness, percs slowly.
2---------- Alikchi variant	Moderate: depth to rock.	Severe: wetness.	Severe: slow refill.	Percs slowly---	Not needed-----	Wetness, percs slowly.
3, 4---------- Bernow	Moderate: seepage.	Slight---------	Severe: deep to water.	Not needed-----	Favorable------	Favorable.
5*: Bernow----------	Moderate: seepage.	Slight---------	Severe: deep to water.	Not needed-----	Slope----------	Slope.
Romia----------	Moderate: seepage, depth to rock.	Moderate: thin layer.	Severe: no water.	Not needed-----	Favorable------	Slope.
6*: Bernow----------	Moderate: seepage.	Slight---------	Severe: deep to water.	Not needed-----	Favorable------	Favorable.
Bosville---------	Slight---------	Moderate: unstable fill, compressible, shrink-swell.	Severe: deep to water, slow refill.	Percs slowly, slope, wetness.	Percs slowly, slope, wetness.	Percs slowly, slope, wetness.
Romia----------	Moderate: seepage, depth to rock.	Moderate: thin layer.	Severe: no water.	Not needed-----	Favorable------	Slope.
7*: Bigfork----------	Severe: depth to rock.	Severe: large stones.	Severe: no water.	Slope----------	Depth to rock, large stones, slope.	Depth to rock, large stones, slope.
Yanush----------	Moderate: seepage.	Moderate: seepage.	Severe: no water.	Slope----------	Favorable------	Favorable.
8---------- Boggy	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Floods---------	Not needed-----	Wetness.
9, 10---------- Bosville	Slight---------	Moderate: unstable fill, compressible, shrink-swell.	Severe: deep to water, slow refill.	Percs slowly, slope, wetness.	Percs slowly, slope, wetness.	Percs slowly, slope, wetness.
11*, 12*: Carnasaw---------	Moderate: depth to rock.	Moderate: thin layer, hard to pack, large stones.	Severe: no water, slow refill.	Not needed-----	Slope, large stones, percs slowly.	Slope, percs slowly, large stones.
Pirum----------	Severe: depth to rock.	Moderate: large stones, compressible, low strength.	Severe: no water.	Not needed-----	Slope, depth to rock, erodes easily.	Erodes easily, slope, large stones.
Clebit----------	Severe: depth to rock, seepage.	Severe: thin layer, large stones.	Severe: no water, large stones.	Not needed-----	Large stones, slope, depth to rock.	Large stones, depth to rock, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
13*, 14*:						
Carnasaw	Moderate: depth to rock.	Moderate: thin layer, hard to pack, large stones.	Severe: no water, slow refill.	Not needed	Percs slowly, large stones.	Percs slowly, large stones.
Stapp	Moderate: depth to rock.	Moderate: thin layer, hard to pack, large stones.	Severe: slow refill.	Percs slowly	Percs slowly, wetness, large stones.	Percs slowly, large stones.
15, 16 Ceda	Severe: seepage.	Severe: seepage.	Severe: deep to water.	Not needed	Not needed	Not needed.
17*:						
Ceda	Severe: seepage.	Severe: seepage.	Severe: deep to water.	Not needed	Not needed	Not needed.
Rubble land.						
18*, 19*:						
Clebit	Severe: depth to rock, seepage.	Severe: thin layer, large stones.	Severe: no water, large stones.	Not needed	Large stones, slope, depth to rock.	Large stones, depth to rock, droughty.
Pirum	Severe: depth to rock.	Moderate: large stones, compressible, low strength.	Severe: no water.	Not needed	Slope, depth to rock, erodes easily.	Erodes easily, slope, large stones.
Carnasaw	Moderate: depth to rock.	Moderate: thin layer, hard to pack, large stones.	Severe: no water, slow refill.	Not needed	Slope, large stones, percs slowly.	Slope, percs slowly, large stones.
20*:						
Clebit	Severe: depth to rock, seepage.	Severe: thin layer, large stones.	Severe: no water, large stones.	Not needed	Large stones, slope, depth to rock.	Large stones, depth to rock, droughty.
Rock outcrop.						
21, 22 Dela	Severe: seepage.	Moderate: unstable fill, seepage.	Moderate: deep to water.	Floods	Not needed	Not needed.
23, 24 Glenpool	Severe: seepage.	Severe: unstable fill, piping.	Severe: no water.	Not needed	Seepage, fast intake.	Seepage.
25 Guyton	Slight	Moderate: erodes easily, low strength, compressible.	Severe: no water.	Cutbanks cave, floods, percs slowly.	Not needed	Wetness.
26*:						
Guyton	Slight	Moderate: erodes easily, low strength, compressible.	Severe: no water.	Cutbanks cave, percs slowly.	Not needed	Wetness.
Elysian	Moderate: seepage.	Moderate: unstable fill, compressible, piping.	Severe: deep to water.	Wetness	Complex slope	Complex slope.
27 Hamden	Moderate: seepage.	Slight	Severe: deep to water, slow refill.	Percs slowly	Percs slowly	Percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
28*:						
Hollywood	Moderate: depth to rock.	Moderate: hard to pack.	Severe: no water, slow refill.	Percs slowly	Percs slowly, erodes easily.	Percs slowly, erodes easily.
Swink	Severe: depth to rock.	Severe: thin layer.	Severe: deep to water.	Not needed	Depth to rock, percs slowly.	Rooting depth, large stones.
29*:						
Honobia	Moderate: depth to rock.	Moderate: thin layer, large stones.	Severe: no water.	Not needed	Slope, large stones, depth to rock.	Large stones, depth to rock, percs slowly.
Nashoba	Severe: seepage.	Moderate: thin layer, large stones.	Severe: no water.	Not needed	Slope, large stones.	Slope, large stones, depth to rock.
30--- Kullit	Moderate: seepage.	Moderate: unstable fill, compressible, piping.	Moderate: deep to water, slow refill.	Percs slowly	Percs slowly	Percs slowly.
31, 32--- Larue	Moderate: seepage.	Slight	Severe: no water.	Not needed	Too sandy	Slope, droughty.
33*:						
Moyers	Moderate: depth to rock.	Moderate: thin layer, wetness, hard to pack.	Moderate: slow refill.	Percs slowly	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Burwell	Slight	Moderate: wetness.	Moderate: deep to water, slow refill.	Percs slowly	Not needed	Erodes easily, percs slowly.
34*:						
Moyers	Moderate: depth to rock.	Moderate: thin layer, wetness, hard to pack.	Moderate: slow refill.	Percs slowly	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Burwell	Slight	Moderate: wetness.	Moderate: deep to water, slow refill.	Percs slowly	Erodes easily, wetness, percs slowly.	Erodes easily, percs slowly.
35*:						
Moyers	Moderate: depth to rock.	Moderate: thin layer, wetness, hard to pack.	Moderate: slow refill.	Percs slowly	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Wister	Moderate: depth to rock.	Moderate: thin layer, unstable fill.	Severe: slow refill.	Percs slowly	Percs slowly	Percs slowly.
Burwell	Slight	Moderate: wetness.	Moderate: deep to water, slow refill.	Percs slowly	Erodes easily, wetness, percs slowly.	Erodes easily, percs slowly.
36--- Nahatche variant	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Floods	Not needed	Wetness.
37--- Pushmataha	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Floods	Not needed	Wetness.
38*:						
Pushmataha	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Floods	Not needed	Wetness.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
38*:						
Elysian	Moderate: seepage.	Moderate: unstable fill, compressible, piping.	Severe: deep to water.	Wetness	Complex slope	Complex slope.
Guyton	Slight	Moderate: erodes easily, low strength, compressible.	Severe: no water.	Cutbanks cave, floods, percs slowly.	Not needed	Wetness.
39--- Rexor	Moderate: seepage.	Moderate: unstable fill, seepage.	Severe: deep to water.	Not needed	Not needed	Not needed.
40--- Ruston	Moderate: seepage.	Slight	Severe: no water.	Not needed	Favorable	Favorable.
41--- Ruston	Moderate: seepage.	Slight	Severe: no water.	Not needed	Favorable	Slope.
42, 43--- Ruston	Moderate: seepage.	Slight	Severe: no water.	Not needed	Favorable	Favorable.
44, 45--- Saffell	Moderate: seepage.	Moderate: seepage, piping, thin layer.	Severe: no water.	Not needed	Erodes easily, slope, small stones.	Droughty, erodes easily, slope.
46, 47, 48--- Shermore	Moderate: seepage.	Moderate: wetness.	Moderate: slow refill.	Favorable	Favorable	Favorable.
49*:						
Sherwood	Moderate: seepage, depth to rock.	Moderate: thin layer, unstable fill.	Severe: no water.	Not needed	Slope	Favorable.
Zafra	Severe: depth to rock.	Moderate: thin layer.	Severe: deep to water.	Not needed	Depth to rock, rooting depth.	Erodes easily, rooting depth.
50*:						
Sherwood	Moderate: seepage, depth to rock.	Moderate: thin layer, unstable fill.	Severe: no water.	Not needed	Slope	Slope.
Zafra	Severe: depth to rock.	Moderate: thin layer.	Severe: deep to water.	Not needed	Depth to rock, rooting depth.	Erodes easily, rooting depth.
51--- Smithdale	Severe: seepage.	Moderate: piping, unstable fill.	Severe: no water.	Not needed, slope.	Favorable	Favorable.
52--- Sobol	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Severe: slow refill.	Percs slowly, depth to rock.	Wetness, percs slowly.	Depth to rock, percs slowly, erodes easily.
53*:						
Sobol	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Severe: slow refill.	Slope, percs slowly, depth to rock.	Slope, wetness, percs slowly.	Depth to rock, slope, percs slowly.
Tuskahoma	Severe: depth to rock.	Severe: thin layer.	Severe: depth to rock, slow refill.	Percs slowly, depth to rock, slope.	Depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
54--- Speer	Moderate: seepage.	Slight	Severe: no water.	Not needed	Favorable	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
55*:						
Tuskahoma	Severe: depth to rock.	Severe: thin layer.	Severe: depth to rock, slow refill.	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
Clebit	Severe: depth to rock, seepage.	Severe: thin layer.	Severe: no water.	Not needed	Slope, depth to rock, rooting depth.	Depth to rock, droughty, rooting depth.
Sobol	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Severe: slow refill.	Slope, percs slowly, depth to rock.	Slope, wetness, percs slowly.	Depth to rock, slope, percs slowly.
56*. Udorthents						
57*:						
Wister	Moderate: depth to rock.	Moderate: thin layer, unstable fill.	Severe: slow refill.	Percs slowly	Percs slowly	Percs slowly.
Burwell	Slight	Moderate: wetness.	Moderate: deep to water, slow refill.	Percs slowly	Not needed	Erodes easily, percs slowly.
58*:						
Wister	Moderate: depth to rock.	Moderate: thin layer, unstable fill.	Severe: slow refill.	Percs slowly	Percs slowly	Percs slowly.
Burwell	Slight	Moderate: wetness.	Moderate: deep to water, slow refill.	Percs slowly	Erodes easily, wetness, percs slowly.	Erodes easily, percs slowly.
59*:						
Wrightsville	Slight	Severe: unstable fill, compressible.	Severe: no water.	Favorable, wetness, percs slowly.	Not needed	Not needed.
Elysian	Moderate: seepage.	Moderate: unstable fill, compressible, piping.	Severe: deep to water.	Wetness	Complex slope	Complex slope.
60, 61, 62--- Yanush	Moderate: seepage.	Moderate: seepage.	Severe: no water.	Slope	Favorable	Favorable.

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 14.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1---------- Alikchi	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
2---------- Alikchi variant	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
3---------- Bernow	Slight----------	Slight----------	Slight----------	Slight.
4---------- Bernow	Slight----------	Slight----------	Moderate: slope.	Slight.
5*:				
Bernow----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Romia----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
6*:				
Bernow----------	Slight----------	Slight----------	Severe: slope.	Slight.
Bosville----------	Severe: percs slowly.	Moderate: wetness.	Severe: percs slowly, slope.	Slight.
Romia----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
7*:				
Bigfork----------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Severe: large stones.
Yanush----------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
8---------- Boggy	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
9---------- Bosville	Severe: percs slowly.	Moderate: wetness.	Severe: percs slowly.	Slight.
10---------- Bosville	Severe: percs slowly.	Moderate: wetness.	Severe: percs slowly, slope.	Slight.
11*, 12*:				
Carnasaw----------	Severe: slope, large stones.	Severe: slope.	Severe: slope.	Moderate: slope, large stones.
Pirum----------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, large stones.
Clebit----------	Severe: large stones, slope.	Severe: large stones, slope.	Severe: slope, small stones, large stones.	Severe: large stones.

See footnote at end of table.

TABLE 14.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
13*, 14*:				
Carnasaw	Moderate: percs slowly.	Moderate: large stones.	Severe: slope.	Moderate: large stones.
Stapp	Moderate: large stones, percs slowly.	Moderate: large stones, wetness.	Moderate: slope, large stones, percs slowly.	Moderate: large stones.
15, 16				
Ceda	Severe: floods, small stones.	Moderate: floods, small stones.	Severe: floods, small stones.	Moderate: floods, small stones.
17*:				
Ceda	Severe: floods, small stones.	Moderate: floods, small stones.	Severe: floods, small stones.	Moderate: floods, small stones.
Rubble land.				
18*, 19*:				
Clebit	Severe: large stones, slope.	Severe: large stones, slope.	Severe: slope, small stones, large stones.	Severe: large stones, slope.
Pirum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Carnasaw	Severe: slope, large stones.	Severe: slope.	Severe: slope.	Severe: slope.
20*:				
Clebit	Severe: large stones, slope.	Severe: large stones, slope.	Severe: slope, small stones, large stones.	Severe: large stones, slope.
Rock outcrop.				
21				
Dela	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight.
22				
Dela	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
23				
Glenpool	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.
24				
Glenpool	Moderate: too sandy.	Moderate: too sandy.	Severe: slope.	Moderate: too sandy.
25				
Guyton	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
26*:				
Guyton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Elysian	Slight	Slight	Slight	Slight.
27				
Hamden	Moderate: percs slowly, wetness.	Slight	Moderate: percs slowly, wetness.	Slight.

See footnote at end of table.

TABLE 14.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
28*:				
Hollywood	Severe: percs slowly.	Moderate: too clayey.	Severe: percs slowly.	Moderate: too clayey.
Swink	Severe: too clayey, large stones.	Severe: too clayey, large stones.	Severe: too clayey, depth to rock.	Severe: too clayey, large stones.
29*:				
Honobia	Moderate: slope, large stones, percs slowly.	Moderate: slope, large stones, small stones.	Severe: slope, small stones.	Moderate: large stones, small stones.
Nashoba	Moderate: large stones, small stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Severe: large stones.
30--- Kullit	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight.
31, 32--- Larue	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy, slope.	Moderate: too sandy.
33*, 34*:				
Moyers	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: percs slowly, slope, wetness.	Slight.
Burwell	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: percs slowly, wetness.	Slight.
35*:				
Moyers	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: percs slowly, slope, wetness.	Slight.
Wister	Severe: percs slowly.	Slight	Moderate: wetness.	Slight.
Burwell	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: percs slowly, wetness.	Slight.
36--- Nahatche variant	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
37--- Pushmataha	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
38*:				
Pushmataha	Severe: wetness, floods.	Severe: wetness.	Severe: floods, wetness.	Severe: wetness.
Elysian	Slight	Slight	Slight	Slight.
Guyton	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.

See footnote at end of table.

TABLE 14.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
39--Rexor	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight.
40--Ruston	Slight	Slight	Slight	Slight.
41, 42, 43--Ruston	Slight	Slight	Moderate: slope.	Slight.
44--Saffell	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
45--Saffell	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.
46, 47, 48--Shermore	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Slight.
49*:				
Sherwood	Slight	Slight	Severe: slope.	Slight.
Zafra	Slight	Slight	Moderate: slope, small stones.	Slight.
50*:				
Sherwood	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Zafra	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
51--Smithdale	Slight	Slight	Severe: slope.	Slight.
52--Sobol	Moderate: slope, percs slowly, wetness.	Moderate: slope, wetness.	Moderate: slope, depth to rock.	Moderate: wetness.
53*:				
Sobol	Moderate: slope, percs slowly, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.
Tuskahoma	Severe: percs slowly, wetness.	Moderate: wetness, slope.	Severe: slope, percs slowly, depth to rock.	Moderate: wetness.
54--Speer	Severe: floods.	Slight	Slight	Slight.
55*:				
Tuskahoma	Severe: percs slowly, wetness.	Moderate: wetness, slope.	Severe: slope, percs slowly, depth to rock.	Moderate: wetness.
Clebit	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, depth to rock, small stones.	Moderate: small stones.

See footnote at end of table.

TABLE 14.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
55*: Sobol	Moderate: slope, percs slowly, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.
56*. Udorthents				
57*, 58*: Wister	Severe: percs slowly.	Slight	Moderate: wetness.	Slight.
Burwell	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: percs slowly, wetness.	Slight.
59*: Wrightsville	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Elysian	Slight	Slight	Slight	Slight.
60, 61 Yanush	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
62 Yanush	Moderate: small stones, slope.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 15.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1---------- Alikchi	Poor	Fair	Fair	Fair	Fair	---	Good	Fair	Fair	Fair	Fair.
2---------- Alikchi variant	Poor	Fair	Fair	Fair	Fair	---	Good	Fair	Fair	Fair	Fair.
3, 4---------- Bernow	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
5*: Bernow----------	Fair	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Romia----------	Poor	Fair	Good	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
6*: Bernow----------	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Bosville----------	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Romia----------	Poor	Fair	Good	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
7*: Bigfork----------	Very poor.	Poor	Fair	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
Yanush----------	Poor	Fair	Good	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
8---------- Boggy	Poor	Fair	Fair	Good	Good	---	Fair	Fair	Fair	Good	Fair.
9---------- Bosville	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
10---------- Bosville	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
11*, 12*: Carnasaw----------	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Pirum----------	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Clebit----------	Very poor.	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Very poor.	Poor	Very poor.	Very poor.
13*, 14*: Carnasaw----------	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Stapp----------	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
15, 16---------- Ceda	Poor	Fair	Fair	Fair	Fair	---	Poor	Very poor.	Fair	Fair	Very poor.

See footnote at end of table.

TABLE 15.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
17*:											
Ceda	Poor	Fair	Fair	Fair	Fair	---	Poor	Very poor.	Fair	Fair	Very poor.
Rubble land.											
18*, 19*:											
Clebit	Very poor.	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Pirum	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
Carnasaw	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
20*:											
Clebit	Very poor.	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Rock outcrop.											
21--- Dela	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
22--- Dela	Poor	Fair	Fair	Good	Good	---	Poor	Poor	Fair	Good	Poor.
23, 24--- Glenpool	Fair	Fair	Good	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
25--- Guyton	Fair	Fair	Fair	Fair	---	---	Good	Good	Fair	Fair	Good.
26*:											
Guyton	Fair	Fair	Fair	Fair	---	---	Good	Good	Fair	Fair	Good.
Elysian	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
27--- Hamden	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Poor.
28*:											
Hollywood	Fair	Fair	Fair	Good	Good	---	Poor	Very poor.	Fair	Good	Very poor.
Swink	Very poor.	Poor	Poor	Poor	Poor	---	Poor	Very poor.	Poor	Poor	Very poor.
29*:											
Honobia	Poor	Fair	Fair	Poor	Poor	---	Very poor.	Very poor.	Fair	Poor	Very poor.
Nashoba	Poor	Fair	Fair	Poor	Poor	---	Very poor.	Very poor.	Fair	Poor	Very poor.
30--- Kullit	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
31, 32--- Larue	Poor	Fair	Good	Good	Good	---	Poor	Very poor.	Fair	Good	Very poor.
33*, 34*:											
Moyers	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
Burwell	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.

See footnote at end of table.

TABLE 15.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
35*:											
Moyers	Fair	Fair	Good	Fair	Good	---	Poor	Poor	Fair	Fair	Poor.
Wister	Fair	Fair	Good	Fair	Good	---	Poor	Poor	Fair	Fair	Poor.
Burwell	Fair	Fair	Good	Fair	Good	---	Poor	Poor	Fair	Fair	Poor.
36--Nahatche variant	Poor	Fair	Fair	Good	Good	---	Fair	Fair	Fair	Good	Fair.
37--Pushmataha	Fair	Good	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.
38*:											
Pushmataha	Poor	Fair	Fair	Good	Good	---	Fair	Fair	Fair	Good	Fair.
Elysian	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
Guyton	Poor	Fair	Fair	Fair	---	---	Good	Good	Poor	Fair	Good.
39--Rexor	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
40--Ruston	Good	Good	Good	---	Good	---	Poor	Very poor.	Good	Good	Very poor.
41--Ruston	Fair	Good	Good	---	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
42, 43--Ruston	Good	Good	Good	---	Good	---	Poor	Very poor.	Good	Good	Very poor.
44--Saffell	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
45--Saffell	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
46, 47, 48--Shermore	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
49*:											
Sherwood	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Zafra	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
50*:											
Sherwood	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Zafra	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
51--Smithdale	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
52--Sobol	Fair	Good	Good	Fair	Good	---	Poor	Very poor.	Good	Fair	Very poor.
53*:											
Sobol	Fair	Good	Good	Fair	Good	---	Poor	Very poor.	Good	Fair	Very poor.
Tuskahoma	Very poor.	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Very poor.	Poor	Very poor.	Very poor.

See footnote at end of table.

TABLE 15.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
54---------- Speer	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
55*:											
Tuskahoma----------	Very poor.	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Clebit----------	Very poor.	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Sobol----------	Fair	Good	Good	Fair	Good	---	Poor	Very poor.	Good	Fair	Very poor.
56*. Udorthents											
57*, 58*:											
Wister----------	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
Burwell----------	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
59*:											
Wrightsville------	Fair	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
Elysian----------	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
60, 61, 62--------- Yanush	Fair	Good	Good	Fair	Fair	---	Poor	Very poor.	Good	Good	Very poor.

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1---------- Alikchi	0-14	Loam----------	CL, ML, CL-ML	A-4	0	100	100	96-100	65-97	<31	NP-10
	14-40	Silt loam, silty clay loam.	CL, ML	A-6, A-4	0	100	100	96-100	80-98	30-40	8-17
	40-45	Weathered bedrock.	---	---	---	---	---	---	---	---	---
2---------- Alikchi variant	0-10	Silt loam-------	CL, ML, CL-ML	A-4	0	100	100	96-100	65-97	<31	NP-10
	10-55	Silty clay loam	CL	A-6, A-7	0	100	100	98-100	90-98	33-42	12-19
	55-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
3---------- Bernow	0-15	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-65	<26	NP-7
	15-38	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
	38-80	Clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
4---------- Bernow	0-10	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-65	<26	NP-7
	10-30	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
	30-65	Clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
5*:											
Bernow----------	0-10	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-65	<26	NP-7
	10-30	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
	30-70	Clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
Romia----------	0-13	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-60	<26	NP-7
	13-56	Sandy clay loam, clay loam, gravelly sandy clay loam.	SC, CL	A-2, A-4, A-6	0	50-100	50-100	50-95	20-90	25-40	7-18
	56-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
6*:											
Bernow----------	0-9	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-65	<26	NP-7
	9-30	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
	30-72	Clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
Bosville----------	0-6	Fine sandy loam	SM, ML, CL, SC	A-4	0	100	98-100	94-100	36-60	<30	NP-10
	6-65	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	100	100	96-100	80-99	37-65	15-35

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
6*:											
Romia	0-11	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-60	<26	NP-7
	11-45	Sandy clay loam, clay loam, gravelly sandy clay loam.	SC, CL	A-2, A-4, A-6	0	50-100	50-100	50-95	20-90	25-40	7-18
	45-50	Weathered bedrock.	---	---	---	---	---	---	---	---	---
7*:											
Bigfork	0-5	Stony silt loam	CL, GC, SC	A-4, A-6	40-75	55-80	55-80	45-80	36-80	22-32	5-15
	5-35	Stony silty clay loam, stony clay loam.	CL, GC, SC	A-6, A-7	40-75	55-80	55-80	50-80	44-80	33-43	12-20
	35-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Yanush	0-12	Coarse cherty silt loam.	ML, CL, GC, GM	A-2, A-4, A-6	0-10	50-70	50-70	45-65	30-65	22-35	2-14
	12-24	Cherty silty clay loam, cherty clay loam, very cherty clay loam.	GC	A-6, A-7, A-2	0-15	25-55	25-55	25-55	20-50	33-43	12-20
	24-80	Cherty silty clay loam, cherty clay loam, very cherty clay loam.	GC, GP-GC	A-2, A-6, A-7	15-30	10-55	10-55	10-50	8-50	33-43	12-20
8 Boggy	0-20	Fine sandy loam	ML, SM, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-85	<29	NP-7
	20-60	Fine sandy loam, loam.	ML, SM, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-85	<29	NP-7
9 Bosville	0-8	Fine sandy loam	SM, ML, CL, SC	A-4	0	100	98-100	94-100	36-60	<30	NP-10
	8-65	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	100	100	96-100	80-99	37-65	15-35
10 Bosville	0-6	Fine sandy loam	SM, ML, CL, SC	A-4	0	100	98-100	94-100	36-60	<30	NP-10
	6-65	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	100	100	96-100	80-99	37-65	15-35
11*:											
Carnasaw	0-7	Stony fine sandy loam.	GM, GC, SM, SC	A-4, A-2	5-35	55-95	55-95	35-95	20-95	<30	NP-10
	7-24	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0	80-95	80-95	75-95	65-95	37-65	16-35
	24-36	Clay, silty clay	CL, CH	A-7	0	80-95	80-95	80-95	70-95	41-65	18-35
	36-41	Gravelly silty clay, gravelly clay, silty clay.	CL, CH, GC, SC	A-7	0-5	45-95	45-95	40-95	40-95	41-65	18-35
	41-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
11*:											
Pirum	0-10	Stony fine sandy loam.	SM, ML	A-4	10-35	75-100	75-100	70-90	36-65	<20	NP-3
	10-35	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0-10	75-100	75-100	70-90	50-70	22-35	5-15
	35-38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Clebit	0-5	Stony fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	10-30	45-60	45-60	30-55	15-45	<31	NP-10
	5-12	Gravelly very fine sandy loam, gravelly loam, gravelly fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	30-40	40-60	40-60	30-55	15-50	<31	NP-10
	12-16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
12*:											
Carnasaw	0-7	Stony fine sandy loam.	GM, GC, SM, SC	A-4, A-2	5-35	55-95	55-95	35-95	20-95	<30	NP-10
	7-24	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0	80-95	80-95	75-95	65-95	37-65	16-35
	24-35	Clay, silty clay	CL, CH	A-7	0	80-95	80-95	80-95	70-95	41-65	18-35
	35-42	Gravelly silty clay, gravelly clay, silty clay.	CL, CH, GC, SC	A-7	0-5	45-95	45-95	40-95	40-95	41-65	18-35
	42-46	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Pirum	0-10	Stony fine sandy loam.	SM, ML	A-4	10-35	75-100	75-100	70-90	36-65	<20	NP-3
	10-34	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0-10	75-100	75-100	70-90	50-70	22-35	5-15
	34-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Clebit	0-5	Stony very fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	10-30	45-60	45-60	30-55	15-45	<31	NP-10
	5-12	Gravelly very fine sandy loam, gravelly loam, gravelly fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	30-40	40-60	40-60	30-55	15-50	<31	NP-10
	12-15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
13*:											
Carnasaw	0-7	Stony fine sandy loam.	GM, GC, SM, SC	A-4, A-2	5-35	55-95	55-95	35-95	20-95	<30	NP-10
	7-20	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0	80-95	80-95	75-95	65-95	37-65	16-35
	20-37	Clay, silty clay	CL, CH	A-7	0	80-95	80-95	80-95	70-95	41-65	18-35
	37-45	Gravelly silty clay, gravelly clay, silty clay.	CL, CH, GC, SC	A-7	0-5	45-95	45-95	40-95	40-95	41-65	18-35
	45-50	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
13*:											
Stapp	0-8	Stony fine sandy loam.	ML, SM, GM, CL-ML	A-2, A-4	5-30	60-85	60-85	55-80	20-70	<29	NP-7
	8-22	Clay loam, clay, gravelly clay loam.	CL, CH	A-6, A-7	5-30	60-100	60-100	55-100	50-95	37-60	16-34
	22-44	Clay, gravelly clay, shaly clay.	CL, CH	A-7	0-10	55-100	55-100	55-100	50-95	45-60	19-34
	44-50	Weathered bedrock.	---	---	---	---	---	---	---	---	---
14*:											
Carnasaw	0-8	Stony fine sandy loam.	GM, GC, SM, SC	A-4, A-2	5-35	55-95	55-95	35-95	20-95	<30	NP-10
	8-24	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0	80-95	80-95	75-95	65-95	37-65	16-35
	24-32	Clay, silty clay	CL, CH	A-7	0	80-95	80-95	80-95	70-95	41-65	18-35
	32-44	Gravelly silty clay, gravelly clay, silty clay.	CL, CH, GC, SC	A-7	0-5	45-95	45-95	40-95	40-95	41-65	18-35
	44-48	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Stapp	0-7	Stony fine sandy loam.	ML, SM, GM, CL-ML	A-2, A-4	5-30	60-85	60-85	55-80	20-70	<29	NP-7
	7-21	Clay loam, clay, gravelly clay loam.	CL, CH	A-6, A-7	5-30	60-100	60-100	55-100	50-95	37-60	16-34
	21-45	Clay, gravelly clay, shaly clay.	CL, CH	A-7	0-10	55-100	55-100	55-100	50-95	45-60	19-34
	45-46	Weathered bedrock.	---	---	---	---	---	---	---	---	---
15---------- Ceda	0-20	Gravelly silt loam.	ML, SM, GM	A-2, A-4	0-5	35-75	35-75	25-70	15-70	<30	NP-7
	20-50	Gravelly loam, gravelly silt loam, gravelly fine sandy loam.	GP, GM, GP-GM	A-2, A-4	0-5	5-50	5-50	5-50	2-48	<30	NP-7
16---------- Ceda	0-24	Gravelly silt loam.	ML, SM, GM	A-2, A-4	0-5	35-75	35-75	25-70	15-70	<30	NP-7
	24-60	Gravelly loam, gravelly silt loam, gravelly fine sandy loam.	GP, GM, GP-GM	A-2, A-4	0-5	5-50	5-50	5-50	2-48	<30	NP-7
17*:											
Ceda	0-12	Gravelly fine sandy loam.	ML, SM, GM	A-2, A-4	0-5	35-75	35-75	25-70	15-70	<30	NP-7
	12-65	Gravelly loam, gravelly silt loam, gravelly fine sandy loam.	GP, GM, GP-GM	A-2, A-4	0-5	5-50	5-50	5-50	2-48	<30	NP-7
Rubble land.											

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
18*:											
Clebit	0-4	Stony very fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	10-30	45-60	45-60	30-55	15-45	<31	NP-10
	4-11	Gravelly very fine sandy loam, gravelly loam, gravelly fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	30-40	40-60	40-60	30-55	15-50	<31	NP-10
	11-14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Pirum	0-10	Stony fine sandy loam.	SM, ML	A-4	10-35	75-100	75-100	70-90	36-65	<20	NP-3
	10-32	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0-10	75-100	75-100	70-90	50-70	22-35	5-15
	32-36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Carnasaw	0-7	Stony fine sandy loam.	GM, GC, SM, SC	A-4, A-2	5-35	55-95	55-95	35-95	20-95	<30	NP-10
	7-17	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0	80-95	80-95	75-95	65-95	37-65	16-35
	17-30	Clay, silty clay	CL, CH	A-7	0	80-95	80-95	80-95	70-95	41-65	18-35
	30-40	Gravelly silty clay, gravelly clay, silty clay.	CL, CH, GC, SC	A-7	0-5	45-95	45-95	40-95	40-95	41-65	18-35
	40-50	Weathered bedrock.	---	---	---	---	---	---	---	---	---
19*:											
Clebit	0-4	Stony very fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	10-30	45-60	45-60	30-55	15-45	<31	NP-10
	4-13	Gravelly very fine sandy loam, gravelly loam, gravelly fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	30-40	40-60	40-60	30-55	15-50	<31	NP-10
	13-15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Pirum	0-10	Stony fine sandy loam.	SM, ML	A-4	10-35	75-100	75-100	70-90	36-65	<20	NP-3
	10-39	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0-10	75-100	75-100	70-90	50-70	22-35	5-15
	39-50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Carnasaw	0-8	Stony fine sandy loam.	GM, GC, SM, SC	A-4, A-2	5-35	55-95	55-95	35-95	20-95	<30	NP-10
	8-20	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0	80-95	80-95	75-95	65-95	37-65	16-35
	20-40	Clay, silty clay	CL, CH	A-7	0	80-95	80-95	80-95	70-95	41-65	18-35
	40-56	Gravelly silty clay, gravelly clay, silty clay.	CL, CH, GC, SC	A-7	0-5	45-95	45-95	40-95	40-95	41-65	18-35
	56-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
20*:											
Clebit	0-4	Stony fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	10-30	45-60	45-60	30-55	15-45	<31	NP-10
	4-12	Gravelly very fine sandy loam, gravelly loam, gravelly fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	30-40	40-60	40-60	30-55	15-50	<31	NP-10
	12-15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
21 Dela	0-12	Fine sandy loam	ML, CL, SM, SC	A-4	0	100	98-100	94-100	36-60	<30	NP-10
	12-36	Fine sandy loam, sandy loam, loam.	ML, CL, SM, SC	A-4	0	100	98-100	94-100	36-70	<30	NP-10
	36-72	Fine sandy loam, sandy loam, loamy fine sand.	ML, CL, SM, SC	A-2, A-4	0	100	98-100	90-100	15-60	<30	NP-10
22 Dela	0-10	Fine sandy loam	ML, CL, SM, SC	A-4	0	100	98-100	94-100	36-60	<30	NP-10
	10-36	Fine sandy loam, sandy loam, loam.	ML, CL, SM, SC	A-4	0	100	98-100	94-100	36-70	<30	NP-10
	36-80	Fine sandy loam, sandy loam, loamy fine sand.	ML, CL, SM, SC	A-2, A-4	0	100	98-100	90-100	15-60	<30	NP-10
23, 24	0-46	Loamy fine sand	SM, SP-SM	A-2, A-3	0	100	98-100	82-100	5-35	---	NP
Glenpool	46-80	Loamy fine sand	SM	A-2, A-4	0	100	98-100	90-100	15-45	<26	NP-4
25	0-12	Silt loam-------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
Guyton	12-32	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0	100	100	95-100	75-95	26-40	6-18
	32-66	Silt loam, silty clay loam, clay loam.	CL, CL-ML, ML	A-6, A-4	0	100	100	95-100	65-95	<40	NP-18
26*:											
Guyton	0-6	Silt loam-------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	6-27	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0	100	100	95-100	75-95	26-40	6-18
	27-70	Silt loam, silty clay loam, clay loam.	CL, CL-ML, ML	A-6, A-4	0	100	100	95-100	65-95	<40	NP-18
Elysian	0-15	Very fine sandy loam.	SM, ML, SC, CL	A-4	0	100	98-100	94-100	36-75	<30	NP-10
	15-60	Loam----------	ML, CL	A-4	0	100	95-100	94-100	65-85	22-30	2-10
27 Hamden	0-5	Fine sandy loam	SM, ML, SM-SC	A-4	0	100	95-100	95-100	36-60	<26	NP-7
	5-30	Sandy clay loam, clay loam, loam.	SC, CL	A-4, A-6	0	100	100	90-100	36-65	25-37	7-16
	30-72	Sandy clay, clay	CL, SC	A-6, A-7	0	100	100	90-100	40-90	35-50	14-25

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
28*:											
Hollywood	0-18	Clay loam	CL	A-6, A-7	0	98-100	98-100	95-100	75-95	25-45	11-25
	18-60	Silty clay, clay	CH	A-7	0	98-100	98-100	95-100	75-95	51-75	25-45
Swink	0-15	Stony clay	CL, CH	A-7	10-85	90-95	90-95	90-95	85-95	45-65	25-40
	15-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
29*:											
Honobia	0-8	Stony fine sandy loam.	SM, GM, SM-SC	A-2, A-4, A-1	0-30	45-70	45-70	30-60	15-50	<29	NP-7
	8-16	Clay loam, clay	GC	A-2, A-6, A-7	0	35-50	35-50	30-50	25-50	37-60	16-34
	16-36	Clay	GC	A-2, A-6, A-7	0	20-50	20-50	20-50	15-45	45-60	19-34
	36-40	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Nashoba	0-4	Stony sandy loam	GM, SM, ML	A-2, A-4, A-1	15-25	50-85	50-85	35-70	17-56	<26	NP-7
	4-40	Stony loam, stony fine sandy loam, stony sandy loam.	GM, SM, GM-GC	A-2, A-4, A-1	25-60	40-70	40-70	30-60	14-46	<26	NP-7
	40-50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
30---------- Kullit	0-16	Fine sandy loam	SM, CL-ML, ML, SM-SC	A-4	0	100	98-100	94-100	36-60	<26	NP-7
	16-48	Loam, sandy clay loam, clay loam.	CL	A-4, A-6	0	100	98-100	90-100	55-85	25-40	8-18
	48-72	Sandy clay, clay	CL, CH	A-7	0	100	98-100	85-95	55-90	44-53	20-27
31---------- Larue	0-28	Loamy fine sand	SM	A-2-4	0	100	98-100	50-75	15-30	---	NP
	28-40	Sandy clay loam	SC, SM-SC	A-2-4, A-4, A-6	0	100	95-100	80-90	30-45	20-35	5-12
	40-72	Sandy clay loam, loam, clay loam.	SM, SM-SC, SC	A-2-4, A-4	0	100	95-100	60-70	30-40	20-30	3-10
32---------- Larue	0-30	Loamy fine sand	SM	A-2-4	0	100	98-100	50-75	15-30	---	NP
	30-50	Sandy clay loam	SC, SM-SC	A-2-4, A-4, A-6	0	100	95-100	80-90	30-45	20-35	5-12
	50-72	Sandy clay loam, loam, clay loam.	SM, SM-SC, SC	A-2-4, A-4	0	100	95-100	60-70	30-40	20-30	3-10
33*, 34*:											
Moyers	0-8	Loam	CL, ML, CL-ML	A-4	0	100	100	94-100	60-90	22-31	2-10
	8-26	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0	100	100	96-100	70-95	35-50	13-25
	26-55	Clay loam, clay	CL, CH	A-6, A-7	0	100	100	96-100	80-95	37-60	16-34
	55-72	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
33*, 34*:											
Burwell	0-32	Loam	CL, ML, CL-ML	A-4	0	100	100	94-100	60-97	22-30	2-10
	32-45	Clay loam, silty clay loam.	CL	A-6, A-7	0	90-100	90-100	90-100	80-98	33-43	12-20
	45-72	Clay loam, clay	CL, CH	A-6, A-7	0	70-100	70-100	70-100	70-95	37-60	16-34
35*:											
Moyers	0-9	Loam	CL, ML, CL-ML	A-4	0	100	100	94-100	60-90	22-31	2-10
	9-24	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0	100	100	96-100	70-95	35-50	13-25
	24-55	Clay loam, clay	CL, CH	A-6, A-7	0	100	100	96-100	80-95	37-60	16-34
	55-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Wister	0-8	Silt loam	ML, CL, CL-ML	A-4	0	97-100	97-100	96-100	70-97	22-30	2-10
	8-58	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7	0	95-100	95-100	95-100	85-99	41-65	18-35
	58-65	Weathered bedrock.	---	---	0	---	---	---	---	---	---
Burwell	0-22	Loam	CL, ML, CL-ML	A-4	0	100	100	94-100	60-97	22-30	2-10
	22-40	Clay loam, silty clay loam.	CL	A-6, A-7	0	90-100	90-100	90-100	80-98	33-43	12-20
	40-70	Clay loam, clay	CL, CH	A-6, A-7	0	70-100	70-100	70-100	70-95	37-60	16-34
36--Nahatche variant	0-10	Sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-60	<26	NP-7
	10-55	Clay loam	CL	A-4, A-6	0	100	100	96-100	75-90	31-40	10-18
	55-80	Clay	CL, CH	A-7	0	100	100	96-100	90-95	45-60	19-34
37--Pushmataha	0-12	Loam	CL, ML, CL-ML	A-4	0	100	100	94-100	51-97	22-31	2-10
	12-22	Loam, very fine sandy loam, silt loam.	CL, ML, CL-ML	A-4	0	100	100	94-100	51-97	22-31	2-10
	22-60	Stratified loam to very fine sandy loam.	CL, ML, CL-ML	A-4	0	100	100	94-100	51-97	22-31	2-10
38*:											
Pushmataha	0-12	Loam	CL, ML, CL-ML	A-4	0	100	100	94-100	51-97	22-31	2-10
	12-30	Loam, very fine sandy loam, silt loam.	CL, ML, CL-ML	A-4	0	100	100	94-100	51-97	22-31	2-10
	30-60	Stratified loam to very fine sandy loam.	CL, ML, CL-ML	A-4	0	100	100	94-100	51-97	22-31	2-10
Elysian	0-30	Fine sandy loam	SM, ML, SC, CL	A-4	0	100	98-100	94-100	36-75	<30	NP-10
	30-70	Loam	ML, CL	A-4	0	100	95-100	94-100	65-85	22-30	2-10
Guyton	0-14	Silt loam	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	14-54	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0	100	100	95-100	75-95	26-40	6-18
	54-66	Silt loam, silty clay loam, clay loam.	CL, CL-ML, ML	A-6, A-4	0	100	100	95-100	65-95	<40	NP-18

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
39---------- Rexor	0-8	Loam----------	ML, CL, CL-ML	A-4, A-6	0	98-100	98-100	96-100	65-97	22-37	3-14
	8-46	Clay loam, silt loam, silty clay loam.	ML, CL	A-4, A-6	0	98-100	98-100	96-100	80-98	30-40	8-17
	46-66	Loam, silt loam	ML, CL	A-4, A-6	0	98-100	98-100	96-100	70-97	30-37	8-14
40, 41---------- Ruston	0-17	Loamy fine sand	SM, ML	A-4, A-2-4	0	85-100	78-100	65-100	30-75	<20	NP-3
	17-42	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-40	11-18
	42-62	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-40	11-18
42, 43---------- Ruston	0-12	Fine sandy loam	SM, ML	A-4, A-2-4	0	85-100	78-100	65-100	30-75	<20	NP-3
	12-47	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-40	11-18
	47-66	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-40	11-18
44---------- Saffell	0-9	Gravelly sandy loam.	SM	A-1, A-2, A-4	0-5	70-80	50-75	40-65	20-40	<20	NP-3
	9-15	Gravelly fine sandy loam, gravelly sandy clay loam.	GC, SC, SM-SC, GM-GC	A-2, A-1	0-15	35-85	25-70	20-55	15-35	20-40	4-18
	15-50	Very gravelly sandy clay loam, very gravelly fine sandy loam, very gravelly loam.	GC, SC, SM-SC, GM-GC	A-2, A-1	0-15	35-85	25-70	20-55	15-35	20-40	4-18
	50-60	Gravelly sandy loam, very gravelly sandy loam, gravelly loamy sand.	GM, GC, SM, SC	A-1, A-2, A-3	0-5	25-80	10-70	5-60	5-35	<35	NP-15
45---------- Saffell	0-11	Gravelly sandy loam.	SM	A-1, A-2, A-4	0-5	70-80	50-75	40-65	20-40	<20	NP-3
	11-22	Gravelly fine sandy loam, gravelly sandy clay loam.	GC, SC, SM-SC, GM-GC	A-2, A-1	0-15	35-85	25-70	20-55	15-35	20-40	4-18
	22-48	Very gravelly sandy clay loam, very gravelly fine sandy loam, very gravelly loam.	GC, SC, SM-SC, GM-GC	A-2, A-1	0-15	35-85	25-70	20-55	15-35	20-40	4-18
	48-60	Gravelly sandy loam, very gravelly sandy loam, gravelly loamy sand.	GM, GC, SM, SC	A-1, A-2, A-3	0-5	25-80	10-70	5-60	5-35	<35	NP-15

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
46---------- Shermore	0-11	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-60	<26	NP-7
	11-65	Sandy clay loam, fine sandy loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	95-100	95-100	95-100	36-65	20-37	5-16
47---------- Shermore	0-12	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-60	<26	NP-7
	12-65	Sandy clay loam, fine sandy loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	95-100	95-100	95-100	36-65	20-37	5-16
48---------- Shermore	0-5	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	98-100	94-100	36-60	<26	NP-7
	5-65	Sandy clay loam, fine sandy loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	95-100	95-100	95-100	36-65	20-37	5-16
49*:											
Sherwood----------	0-8	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	75-100	60-100	25-60	<25	NP-7
	8-24	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	70-97	65-97	60-90	45-65	25-40	8-18
	24-42	Gravelly clay loam, gravelly loam, gravelly sandy clay loam.	SC, GC	A-4, A-6	0	55-75	50-75	45-70	36-50	25-40	8-18
	42-55	Gravelly loam, very gravelly loam, gravelly clay loam.	SC, GC	A-2, A-4, A-6	5-15	45-75	40-75	35-50	25-50	25-40	8-18
	55-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Zafra----------	0-9	Fine sandy loam	SM, ML	A-4	0-2	75-90	70-90	65-85	36-75	<24	NP-4
	9-20	Loam, gravelly loam.	CL-ML, ML	A-4	0-2	65-85	60-85	55-80	50-75	<27	NP-7
	20-55	Gravelly loam, gravelly clay loam, very gravelly sandy clay loam.	GC, GP-GC, GM, GM-GC	A-2, A-1	0-5	30-50	25-50	15-45	10-35	<37	NP-18
	55-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
50*:											
Sherwood	0-9	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	75-100	60-100	25-60	<25	NP-7
	9-20	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	70-97	65-97	60-90	45-65	25-40	8-18
	20-40	Gravelly clay loam, gravelly loam, gravelly sandy clay loam.	SC, GC	A-4, A-6	0	55-75	50-75	45-70	36-50	25-40	8-18
	40-50	Gravelly loam, very gravelly loam, gravelly clay loam.	SC, GC	A-2, A-4, A-6	5-15	45-75	40-75	35-50	25-50	25-40	8-18
	50-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Zafra	0-8	Fine sandy loam	SM, ML	A-4	0-2	75-90	70-90	65-85	36-75	<24	NP-4
	8-16	Loam, gravelly loam.	CL-ML, ML	A-4	0-2	65-80	60-85	55-80	50-75	<27	NP-7
	16-32	Gravelly loam, gravelly clay loam, very gravelly sandy clay loam.	GC, GP-GC, GM, GM-GC	A-2, A-1	0-5	30-50	25-50	15-45	10-35	<37	NP-18
	32-50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
51	0-9	Fine sandy loam	SM, SM-SC	A-4	0	100	85-100	60-80	36-49	<20	NP-5
Smithdale	9-40	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	0	100	85-100	80-95	45-75	23-38	7-15
	40-65	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-80	36-70	<30	NP-10
52	0-10	Clay loam	CL	A-6, A-7	0-15	85-100	85-100	75-95	65-90	34-43	13-20
Sobol	10-17	Clay loam, silty clay loam.	CL	A-6, A-7	0	85-100	85-100	75-98	65-98	37-50	15-26
	17-29	Clay, silty clay	CL, CH	A-7	0	85-100	85-100	75-99	75-99	41-60	18-34
	29-39	Clay, shaly clay	CL, CH	A-7	0	70-90	70-90	65-90	65-90	41-60	18-34
	39-45	Weathered bedrock.	---	---	---	---	---	---	---	---	---
53*:											
Sobol	0-7	Loam	ML, CL	A-4, A-6	0-15	85-100	85-100	75-100	55-97	30-37	8-14
	7-14	Clay loam, silty clay loam.	CL	A-6, A-7	0	85-100	85-100	75-98	65-98	37-50	15-26
	14-25	Clay, silty clay	CL, CH	A-7	0	85-100	85-100	75-99	75-99	41-60	18-34
	25-30	Clay, shaly clay	CL, CH	A-7	0	70-90	70-90	65-90	65-90	41-60	18-34
	30-35	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Tuskahoma	0-4	Loam	ML, CL, CL-ML	A-4	0	85-100	80-100	75-100	55-97	22-31	2-10
	4-10	Clay, silty clay, silty clay loam.	CH, CL	A-7	0	60-100	55-100	50-100	50-99	37-60	15-34
	10-16	Shaly silty clay, shaly clay, shaly silty clay loam.	CH, CL, GC, SC	A-7	0	45-70	45-70	40-70	30-70	37-60	15-34
	16-20	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
54----------	0-9	Loam----------	ML, CL-ML	A-4	0	100	100	96-100	65-85	22-29	2-7
Speer	9-15	Loam, fine sandy loam, sandy clay loam.	CL, ML, SC, SM	A-4, A-6	0	100	98-100	90-100	36-85	22-40	2-18
	15-55	Clay loam, sandy clay loam, loam.	CL, SC	A-4, A-6	0	100	100	90-100	36-90	25-40	7-18
	55-72	Loam, fine sandy loam.	ML, SM, CL-ML, SM-SC	A-4	0	100	80-100	80-100	36-85	<29	NP-7
55*:											
Tuskahoma----------	0-4	Loam----------	ML, CL, CL-ML	A-4	0	85-100	80-100	75-100	55-97	22-31	2-10
	4-12	Clay, silty clay, silty clay loam.	CH, CL	A-7	0	60-100	55-100	50-100	50-99	37-60	15-34
	12-18	Shaly silty clay, shaly clay, shaly silty clay loam.	CH, CL, GC, SC	A-7	0	45-70	45-70	40-70	30-70	37-60	15-34
	18-25	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Clebit----------	0-5	Very gravelly fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	0-10	45-60	45-60	30-55	15-45	<31	NP-10
	5-12	Gravelly very fine sandy loam, gravelly loam, gravelly fine sandy loam.	GM-GC, GM, GC	A-4, A-2, A-1	30-40	40-60	40-60	30-55	15-50	<31	NP-10
	12-15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Sobol----------	0-6	Loam----------	ML, CL	A-4, A-6	0-15	85-100	85-100	75-100	55-97	30-37	8-14
	6-13	Clay loam, silty clay loam.	CL	A-6, A-7	0	85-100	85-100	75-98	65-98	37-50	15-26
	13-24	Clay, silty clay	CL, CH	A-7	0	85-100	85-100	75-99	75-99	41-60	18-34
	24-32	Clay, shaly clay	CL, CH	A-7	0	70-90	70-90	65-90	65-90	41-60	18-34
	32-37	Weathered bedrock.	---	---	---	---	---	---	---	---	---
56*. Udorthents											
57*:											
Wister----------	0-9	Silt loam-------	ML, CL, CL-ML	A-4	0	97-100	97-100	96-100	70-97	22-30	2-10
	9-52	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7	0	95-100	95-100	95-100	85-99	41-65	18-35
	52-60	Weathered bedrock.	---	---	0	---	---	---	---	---	---
Burwell----------	0-26	Loam----------	CL, ML, CL-ML	A-4	0	100	100	94-100	60-97	22-30	2-10
	26-42	Clay loam, silty clay loam.	CL	A-6, A-7	0	90-100	90-100	90-100	80-98	33-43	12-20
	42-64	Clay loam, clay	CL, CH	A-6, A-7	0	70-100	70-100	70-100	70-95	37-60	16-34

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
58*:											
Wister	0-14	Silt loam	ML, CL, CL-ML	A-4	0	97-100	97-100	96-100	70-97	22-30	2-10
	14-52	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7	0	95-100	95-100	95-100	85-99	41-65	18-35
	52-60	Weathered bedrock.	---	---	0	---	---	---	---	---	---
Burwell	0-24	Loam	CL, ML, CL-ML	A-4	0	100	100	94-100	60-97	22-30	2-10
	24-38	Clay loam, silty clay loam.	CL	A-6, A-7	0	90-100	90-100	90-100	80-98	33-43	12-20
	38-65	Clay loam, clay	CL, CH	A-6, A-7	0	70-100	70-100	70-100	70-95	37-60	16-34
59*:											
Wrightsville	0-11	Silt loam	ML, CL, CL-ML	A-4	0	100	95-100	90-100	75-100	<31	NP-10
	11-48	Silty clay, clay, silty clay loam.	CH, CL, MH	A-7	0	100	100	95-100	90-100	41-65	22-40
	48-60	Silty clay loam, silty clay, clay.	CL, CH, MH	A-7, A-6	0	100	95-100	95-100	90-100	35-65	16-40
Elysian	0-26	Fine sandy loam	SM, ML, SC, CL	A-4	0	100	98-100	94-100	36-75	<30	NP-10
	26-65	Loam	ML, CL	A-4	0	100	95-100	94-100	65-85	22-30	2-10
60 Yanush	0-9	Cherty silt loam	ML, CL, GC, GM	A-2, A-4, A-6	0	50-70	50-70	45-65	30-65	22-35	2-14
	9-14	Cherty silty clay loam, cherty clay loam, very cherty clay loam.	GC	A-6, A-7, A-2	0-15	25-55	25-55	25-55	20-50	33-43	12-20
	14-75	Cherty silty clay loam, cherty clay loam, very cherty clay loam.	GC, GP-GC	A-2, A-6, A-7	15-30	10-55	10-55	10-50	8-50	33-43	12-20
61 Yanush	0-16	Cherty silt loam	ML, CL, GC, GM	A-2, A-4, A-6	0	50-70	50-70	45-65	30-65	22-35	2-14
	16-20	Cherty silty clay loam, cherty clay loam, very cherty clay loam.	GC	A-6, A-7, A-2	0-15	25-55	25-55	25-55	20-50	33-43	12-20
	20-70	Cherty silty clay loam, cherty clay loam, very cherty clay loam.	GC, GP-GC	A-2, A-6, A-7	15-30	10-55	10-55	10-50	8-50	33-43	12-20

See footnote at end of table.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
62---------- Yanush	0-8	Cherty silt loam	ML, CL, GC, GM	A-2, A-4, A-6	0	50-70	50-70	45-65	30-65	22-35	2-14
	8-13	Cherty silty clay loam, cherty clay loam, very cherty clay loam.	GC	A-6, A-7, A-2	0-15	25-55	25-55	25-55	20-50	33-43	12-20
	13-70	Cherty silty clay loam, cherty clay loam, very cherty clay loam.	GC, GP-GC	A-2, A-6, A-7	15-30	10-55	10-55	10-50	8-50	33-43	12-20

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than. The erosion tolerance factor (T) is for the entire profile. Absence of an entry means data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
							K	T
	In	In/hr	In/in	pH	Mmhos/cm			
1----------	0-14	0.6-2.0	0.15-0.24	5.1-6.0	<2	Low----------	0.43	3
Alikchi	14-40	0.06-0.2	0.16-0.24	5.1-7.3	<2	Moderate-----	0.43	
	40-45	---	---	---	---	----------	---	
2----------	0-10	0.6-2.0	0.15-0.24	5.1-6.5	<2	Low----------	0.43	4
Alikchi variant	10-55	0.06-0.2	0.18-0.22	5.1-7.8	<2	Moderate-----	0.37	
	55-60	---	---	---	---	----------	---	
3----------	0-15	2.0-6.0	0.11-0.15	5.1-7.3	<2	Low----------	0.24	5
Bernow	15-38	0.6-2.0	0.12-0.20	4.5-6.5	<2	Moderate-----	0.32	
	38-80	0.6-2.0	0.12-0.20	4.5-6.5	<2	Low----------	0.32	
4----------	0-10	2.0-6.0	0.11-0.15	5.1-7.3	<2	Low----------	0.24	5
Bernow	10-30	0.6-2.0	0.12-0.20	4.5-6.5	<2	Moderate-----	0.32	
	30-65	0.6-2.0	0.12-0.20	4.5-6.5	<2	Low----------	0.32	
5*:								
Bernow----------	0-10	2.0-6.0	0.11-0.15	5.1-7.3	<2	Low----------	0.24	5
	10-30	0.6-2.0	0.12-0.20	4.5-6.5	<2	Moderate-----	0.32	
	30-70	0.6-2.0	0.12-0.20	4.5-6.5	<2	Low----------	0.32	
Romia----------	0-13	2.0-6.0	0.11-0.15	5.1-6.5	<2	Low----------	0.24	3
	13-56	0.6-2.0	0.08-0.18	4.5-6.0	<2	Low----------	0.32	
	56-60	---	---	---	---	----------	---	
6*:								
Bernow----------	0-9	2.0-6.0	0.11-0.15	5.1-7.3	<2	Low----------	0.24	5
	9-30	0.6-2.0	0.12-0.20	4.5-6.5	<2	Moderate-----	0.32	
	30-72	0.6-2.0	0.12-0.20	4.5-6.5	<2	Low----------	0.32	
Bosville--------	0-6	0.6-2.0	0.11-0.15	5.1-6.0	<2	Low----------	0.37	5
	6-65	<0.06	0.15-0.20	4.5-6.0	<2	High---------	0.43	
Romia----------	0-11	2.0-6.0	0.11-0.15	5.1-6.5	<2	Low----------	0.24	3
	11-45	0.6-2.0	0.08-0.18	4.5-6.0	<2	Low----------	0.32	
	45-50	---	---	---	---	----------	---	
7*:								
Bigfork---------	0-5	0.6-2.0	0.05-0.15	5.1-6.5	<2	Low----------	0.37	2
	5-35	0.6-2.0	0.05-0.15	4.5-6.0	<2	Moderate-----	0.32	
	35-40	---	---	---	---	----------	---	
Yanush----------	0-12	0.6-2.0	0.08-0.17	5.6-6.5	<2	Low----------	0.32	5
	12-24	0.6-2.0	0.08-0.11	4.5-6.0	<2	Moderate-----	0.28	
	24-80	0.6-2.0	0.05-0.11	4.5-6.0	<2	Moderate-----	0.28	
8----------	0-20	0.6-2.0	0.11-0.15	5.6-6.5	<2	Low----------	0.24	5
Boggy	20-60	0.6-2.0	0.11-0.15	5.1-6.5	<2	Low----------	0.24	
9----------	0-8	0.6-2.0	0.11-0.15	5.1-6.0	<2	Low----------	0.37	5
Bosville	8-65	<0.06	0.15-0.20	4.5-6.0	<2	High---------	0.43	
10----------	0-6	0.6-2.0	0.11-0.15	5.1-6.0	<2	Low----------	0.37	5
Bosville	6-65	<0.06	0.15-0.20	4.5-6.0	<2	High---------	0.43	
11*:								
Carnasaw--------	0-7	0.6-2.0	0.11-0.20	4.5-6.0	<2	Low----------	0.37	4
	7-24	0.2-0.6	0.12-0.20	4.5-5.5	<2	High---------	0.37	
	24-36	0.06-0.2	0.12-0.18	4.5-5.5	<2	High---------	0.32	
	36-41	0.06-0.2	0.08-0.13	4.5-5.5	<2	High---------	0.32	
	41-60	---	---	---	---	----------	---	

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
							K	T
	In	In/hr	In/in	pH	Mmhos/cm			
11*:								
Pirum	0-10	0.6-2.0	0.8-0.12	4.5-5.5	---	Low	0.20	3
	10-35	0.6-2.0	0.12-0.16	4.5-5.5	---	Low	0.32	
	35-38	---	---	---	---	---	---	
Clebit	0-5	2.0-6.0	0.06-0.10	5.1-6.5	<2	Low	0.20	1
	5-12	2.0-6.0	0.06-0.10	4.5-6.5	<2	Low	0.20	
	12-16	---	---	---	---	---	---	
12*:								
Carnasaw	0-7	0.6-2.0	0.11-0.20	4.5-6.0	<2	Low	0.37	4
	7-24	0.2-0.6	0.12-0.20	4.5-5.5	<2	High	0.37	
	24-35	0.06-0.2	0.12-0.18	4.5-5.5	<2	High	0.32	
	35-42	0.06-0.2	0.08-0.13	4.5-5.5	<2	High	0.32	
	42-46	---	---	---	---	---	---	
Pirum	0-10	0.6-2.0	0.8-0.12	4.5-5.5	---	Low	0.20	3
	10-34	0.6-2.0	0.12-0.16	4.5-5.5	---	Low	0.32	
	34-40	---	---	---	---	---	---	
Clebit	0-5	2.0-6.0	0.06-0.10	5.1-6.5	<2	Low	0.20	1
	5-12	2.0-6.0	0.06-0.10	4.5-6.5	<2	Low	0.20	
	12-15	---	---	---	---	---	---	
13*:								
Carnasaw	0-7	0.6-2.0	0.11-0.20	4.5-6.0	<2	Low	0.37	4
	7-20	0.2-0.6	0.12-0.20	4.5-5.5	<2	High	0.37	
	20-37	0.06-0.2	0.12-0.18	4.5-5.5	<2	High	0.32	
	37-45	0.06-0.2	0.08-0.13	4.5-5.5	<2	High	0.32	
	45-50	---	---	---	---	---	---	
Stapp	0-8	0.6-2.0	0.05-0.17	4.5-6.0	<2	Low	0.32	3
	8-22	0.2-0.6	0.08-0.20	4.5-6.0	<2	Moderate	0.32	
	22-44	0.06-0.2	0.08-0.18	3.6-5.5	<2	High	0.32	
	44-50	---	---	---	---	---	---	
14*:								
Carnasaw	0-8	0.6-2.0	0.11-0.20	4.5-6.0	<2	Low	0.37	4
	8-24	0.2-0.6	0.12-0.20	4.5-5.5	<2	High	0.37	
	24-32	0.06-0.2	0.12-0.18	4.5-5.5	<2	High	0.32	
	32-44	0.06-0.2	0.08-0.13	4.5-5.5	<2	High	0.32	
	44-48	---	---	---	---	---	---	
Stapp	0-7	0.6-2.0	0.05-0.17	4.5-6.0	<2	Low	0.32	3
	7-21	0.2-0.6	0.08-0.20	4.5-6.0	<2	Moderate	0.32	
	21-45	0.06-0.2	0.08-0.18	3.6-5.5	<2	High	0.32	
	45-46	---	---	---	---	---	---	
15	0-20	6.0-20	0.10-0.15	5.6-6.5	<2	Low	0.28	5
Ceda	20-50	6.0-20	0.05-0.10	5.6-6.5	<2	Low	0.32	
16	0-24	6.0-20	0.10-0.15	5.6-6.5	<2	Low	0.28	5
Ceda	24-60	6.0-20	0.05-0.10	5.6-6.5	<2	Low	0.32	
17*:								
Ceda	0-12	6.0-20	0.10-0.15	5.6-6.5	<2	Low	0.28	5
	12-65	6.0-20	0.05-0.10	5.6-6.5	<2	Low	0.32	
Rubble land.								
18*:								
Clebit	0-4	2.0-6.0	0.06-0.10	5.1-6.5	<2	Low	0.20	1
	4-11	2.0-6.0	0.06-0.10	4.5-6.5	<2	Low	0.20	
	11-14	---	---	---	---	---	---	
Pirum	0-10	0.6-2.0	0.8-0.12	4.5-5.5	---	Low	0.20	3
	10-32	0.6-2.0	0.12-0.16	4.5-5.5	---	Low	0.32	
	32-36	---	---	---	---	---	---	

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
							K	T
	In	In/hr	In/in	pH	Mmhos/cm			
18*:								
Carnasaw	0-7	0.6-2.0	0.11-0.20	4.5-6.0	<2	Low	0.37	4
	7-17	0.2-0.6	0.12-0.20	4.5-5.5	<2	High	0.37	
	17-30	0.06-0.2	0.12-0.18	4.5-5.5	<2	High	0.32	
	30-40	0.06-0.2	0.08-0.13	4.5-5.5	<2	High	0.32	
	40-50	---	---	---	---	---	---	
19*:								
Clebit	0-4	2.0-6.0	0.06-0.10	5.1-6.5	<2	Low	0.20	1
	4-13	2.0-6.0	0.06-0.10	4.5-6.5	<2	Low	0.20	
	13-15	---	---	---	---	---	---	
Pirum	0-10	0.6-2.0	0.8-0.12	4.5-5.5	---	Low	0.20	3
	10-39	0.6-2.0	0.12-0.16	4.5-5.5	---	Low	0.32	
	39-50	---	---	---	---	---	---	
Carnasaw	0-8	0.6-2.0	0.11-0.20	4.5-6.0	<2	Low	0.37	4
	8-20	0.2-0.6	0.12-0.20	4.5-5.5	<2	High	0.37	
	20-40	0.06-0.2	0.12-0.18	4.5-5.5	<2	High	0.32	
	40-56	0.06-0.2	0.08-0.13	4.5-5.5	<2	High	0.32	
	56-60	---	---	---	---	---	---	
20*:								
Clebit	0-4	2.0-6.0	0.06-0.10	5.1-6.5	<2	Low	0.20	1
	4-12	2.0-6.0	0.06-0.10	4.5-6.5	<2	Low	0.20	
	12-15	---	---	---	---	---	---	
Rock outcrop.								
21	0-12	2.0-6.0	0.10-0.15	5.1-6.5	<2	Low	0.20	5
Dela	12-36	2.0-6.0	0.10-0.20	5.1-6.5	<2	Low	0.32	
	36-72	2.0-6.0	0.07-0.15	5.1-6.5	<2	Low	0.20	
22	0-10	2.0-6.0	0.10-0.15	5.1-6.5	<2	Low	0.20	5
Dela	10-36	2.0-6.0	0.10-0.20	5.1-6.5	<2	Low	0.32	
	36-80	2.0-6.0	0.07-0.15	5.1-6.5	<2	Low	0.20	
23, 24	0-46	6.0-20	0.05-0.11	5.6-6.5	<2	Low	0.17	5
Glenpool	46-80	6.0-20	0.07-0.14	4.5-5.5	<2	Low	0.20	
25	0-12	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low	0.49	3
Guyton	12-32	0.06-0.2	0.15-0.22	4.5-5.5	<2	Low	0.37	
	32-66	0.06-2.0	0.15-0.22	5.1-8.4	<2	Low	0.37	
26*:								
Guyton	0-6	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low	0.49	3
	6-27	0.06-0.2	0.15-0.22	4.5-5.5	<2	Low	0.37	
	27-70	0.06-2.0	0.15-0.22	5.1-8.4	<2	Low	0.37	
Elysian	0-15	2.0-6.0	0.11-0.20	4.5-6.5	<2	Low	0.37	5
	15-60	0.6-2.0	0.15-0.20	4.5-6.0	<2	Low	0.37	
27	0-5	2.0-6.0	0.11-0.15	4.5-6.0	<2	Low	0.24	5
Hamden	5-30	0.6-2.0	0.12-0.17	4.5-6.0	<2	Low	0.32	
	30-72	0.2-0.6	0.12-0.18	4.5-6.0	<2	Moderate	0.28	
28*:								
Hollywood	0-18	0.2-0.6	0.15-0.22	6.1-8.4	<2	Moderate	0.32	3
	18-60	<0.06	0.12-0.18	6.6-8.4	<2	High	0.37	
Swink	0-15	0.06-0.2	0.07-0.12	6.6-8.4	<2	High	0.32	1
	15-20	---	---	---	---	---	---	

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
							K	T
	In	In/hr	In/in	pH	Mmhos/cm			
29*:								
Honobia	0-8	0.6-2.0	0.06-0.12	5.1-6.5	<2	Low	0.28	2
	8-16	0.2-0.6	0.06-0.13	4.5-6.0	<2	High	0.28	
	16-36	0.06-0.2	0.04-0.12	4.5-6.0	<2	High	0.28	
	36-40	---	---	---	---	---	---	
Nashoba	0-4	2.0-6.0	0.05-0.14	5.1-6.0	<2	Low	0.17	2
	4-40	2.0-6.0	0.02-0.12	5.1-6.0	<2	Low	0.17	
	40-50	---	---	---	---	---	---	
30--	0-16	2.0-6.0	0.11-0.15	5.1-6.5	<2	Low	0.37	5
Kullit	16-48	0.6-2.0	0.11-0.15	4.5-5.5	<2	Low	0.28	
	48-72	0.2-0.6	0.11-0.15	4.5-5.0	<2	Moderate	---	
31--	0-28	6.0-20	0.05-0.10	5.6-6.5	<2	Low	0.17	5
Larue	28-40	0.6-2.0	0.10-0.15	5.1-6.5	<2	Low	0.24	
	40-72	0.6-2.0	0.10-0.15	5.1-6.5	<2	Low	0.24	
32--	0-30	6.0-20	0.05-0.10	5.6-6.5	<2	Low	0.17	5
Larue	30-50	0.6-2.0	0.10-0.15	5.1-6.5	<2	Low	0.24	
	50-72	0.6-2.0	0.10-0.15	5.1-6.5	<2	Low	0.24	
33*, 34*:								
Moyers	0-8	0.6-2.0	0.15-0.22	5.6-6.5	<2	Low	0.43	3
	8-26	0.06-0.6	0.15-0.20	4.5-6.5	<2	Moderate	0.37	
	26-55	0.06-0.2	0.12-0.18	5.1-7.3	<2	High	0.32	
	55-72	---	---	---	---	---	---	
Burwell	0-32	0.6-2.0	0.15-0.20	5.1-6.0	<2	Low	0.43	5
	32-45	0.2-0.6	0.15-0.20	5.1-7.3	<2	Moderate	0.37	
	45-72	0.06-0.2	0.12-0.20	5.6-8.4	<2	High	0.32	
35*:								
Moyers	0-9	0.6-2.0	0.15-0.22	5.6-6.5	<2	Low	0.43	3
	9-24	0.06-0.6	0.15-0.20	4.5-6.5	<2	Moderate	0.37	
	24-55	0.06-0.2	0.12-0.18	5.1-7.3	<2	High	0.32	
	55-60	---	---	---	---	---	---	
Wister	0-8	0.6-2.0	0.16-0.24	4.5-6.0	<2	Low	0.43	4
	8-58	<0.06	0.14-0.22	4.5-8.4	<2	High	0.37	
	58-65	---	---	---	---	---	---	
Burwell	0-22	0.6-2.0	0.15-0.20	5.1-6.0	<2	Low	0.43	5
	22-40	0.2-0.6	0.15-0.20	5.1-7.3	<2	Moderate	0.37	
	40-70	0.06-0.2	0.12-0.20	5.6-8.4	<2	High	0.32	
36--	0-10	2.0-6.0	0.11-0.15	5.1-6.5	<2	Low	0.28	5
Nahatche variant	10-55	0.6-2.0	0.15-0.20	5.1-6.5	<2	Low	0.37	
	55-80	0.06-0.2	0.12-0.18	5.1-6.5	<2	High	0.32	
37--	0-12	0.6-2.0	0.13-0.20	5.1-6.5	<2	Low	0.37	5
Pushmataha	12-22	0.6-2.0	0.13-0.20	5.1-7.3	<2	Low	0.37	
	22-60	0.6-2.0	0.13-0.20	5.1-7.3	<2	Low	0.37	
38*:								
Pushmataha	0-12	0.6-2.0	0.13-0.20	5.1-6.5	<2	Low	0.37	5
	12-30	0.6-2.0	0.13-0.20	5.1-7.3	<2	Low	0.37	
	30-60	0.6-2.0	0.13-0.20	5.1-7.3	<2	Low	0.37	
Elysian	0-30	2.0-6.0	0.11-0.20	4.5-6.5	<2	Low	0.37	5
	30-70	0.6-2.0	0.15-0.20	4.5-6.0	<2	Low	0.37	
Guyton	0-14	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low	0.49	3
	14-54	0.06-0.2	0.15-0.22	4.5-5.5	<2	Low	0.37	
	54-66	0.06-2.0	0.15-0.22	5.1-8.4	<2	Low	0.37	

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
							K	T
	In	In/hr	In/in	pH	Mmhos/cm			
39----------	0-8	0.6-2.0	0.15-0.24	4.5-6.0	<2	Low----------	0.37	5
Rexor	8-46	0.6-2.0	0.15-0.24	4.5-6.0	<2	Moderate-----	0.37	
	46-66	0.6-2.0	0.15-0.24	4.5-6.0	<2	Low----------	0.37	
40, 41, 42, 43---	0-17	0.6-2.0	0.09-0.16	5.1-6.5	<2	Low----------	0.32	5
Ruston	17-42	0.6-2.0	0.12-0.17	4.5-6.0	<2	Low----------	0.28	
	42-62	0.6-2.0	0.12-0.17	4.5-6.0	<2	Low----------	0.28	
44----------	0-9	2.0-6.0	0.05-0.10	4.5-5.5	<2	Low----------	0.20	4
Saffell	9-15	0.6-2.0	0.06-0.10	4.5-5.5	<2	Low----------	0.28	
	15-50	0.6-2.0	0.06-0.12	4.5-5.5	<2	Low----------	0.28	
	50-60	0.6-6.0	0.04-0.11	4.5-5.5	<2	Low----------	0.17	
45----------	0-11	2.0-6.0	0.05-0.10	4.5-5.5	<2	Low----------	0.20	4
Saffell	11-22	0.6-2.0	0.06-0.10	4.5-5.5	<2	Low----------	0.28	
	22-48	0.6-2.0	0.06-0.12	4.5-5.5	<2	Low----------	0.28	
	48-60	0.6-6.0	0.04-0.11	4.5-5.5	<2	Low----------	0.17	
46----------	0-11	2.0-6.0	0.11-0.15	5.1-6.0	<2	Low----------	0.24	5
Shermore	11-65	0.6-2.0	0.11-0.17	4.5-6.0	<2	Low----------	0.32	
47----------	0-12	2.0-6.0	0.11-0.15	5.1-6.0	<2	Low----------	0.24	5
Shermore	12-65	0.6-2.0	0.11-0.17	4.5-6.0	<2	Low----------	0.32	
48----------	0-5	2.0-6.0	0.11-0.15	5.1-6.0	<2	Low----------	0.24	5
Shermore	5-65	0.6-2.0	0.11-0.17	4.5-6.0	<2	Low----------	0.32	
49*:								
Sherwood--------	0-8	2.0-6.0	0.10-0.20	4.5-6.0	<2	Low----------	0.24	4
	8-24	0.6-2.0	0.11-0.18	4.5-5.5	<2	Low----------	0.32	
	24-42	0.6-2.0	0.09-0.15	4.5-5.5	<2	Low----------	0.32	
	42-55	0.6-2.0	0.08-0.14	4.5-5.5	<2	Low----------	0.32	
	55-60	---	---	---	---	----------	---	
Zafra----------	0-9	0.6-2.0	0.10-0.19	5.1-6.0	<2	Low----------	0.37	3
	9-20	0.6-2.0	0.10-0.19	4.5-5.0	<2	Low----------	0.37	
	20-55	0.6-2.0	0.10-0.15	4.5-5.0	<2	Low----------	0.32	
	55-60	---	---	---	---	----------	---	
50*:								
Sherwood--------	0-9	2.0-6.0	0.10-0.20	4.5-6.0	<2	Low----------	0.24	4
	9-20	0.6-2.0	0.11-0.18	4.5-5.5	<2	Low----------	0.32	
	20-40	0.6-2.0	0.09-0.15	4.5-5.5	<2	Low----------	0.32	
	40-50	0.6-2.0	0.08-0.14	4.5-5.5	<2	Low----------	0.32	
	50-60	---	---	---	---	----------	---	
Zafra----------	0-8	0.6-2.0	0.10-0.19	5.1-6.0	<2	Low----------	0.37	3
	8-16	0.6-2.0	0.10-0.19	4.5-5.0	<2	Low----------	0.37	
	16-32	0.6-2.0	0.10-0.15	4.5-5.0	<2	Low----------	0.32	
	32-50	---	---	---	---	----------	---	
51----------	0-9	2.0-6.0	0.14-0.16	4.5-5.5	<2	Low----------	0.28	5
Smithdale	9-40	0.6-2.0	0.15-0.17	4.5-5.5	<2	Low----------	0.24	
	40-65	2.0-6.0	0.14-0.16	4.5-5.5	<2	Low----------	0.28	
52----------	0-10	0.2-0.6	0.15-0.20	5.1-6.0	<2	Moderate-----	0.37	3
Sobol	10-17	0.2-0.6	0.15-0.20	4.5-6.5	<2	Moderate-----	0.37	
	17-29	0.06-0.2	0.12-0.18	4.5-6.5	<2	High---------	0.32	
	29-39	0.06-0.2	0.08-0.16	6.1-8.4	<2	High---------	0.32	
	39-45	---	---	---	---	----------	---	
53*:								
Sobol----------	0-7	0.6-2.0	0.15-0.24	5.1-6.0	<2	Low----------	0.43	3
	7-14	0.2-0.6	0.15-0.20	4.5-6.5	<2	Moderate-----	0.37	
	14-25	0.06-0.2	0.12-0.18	4.5-6.5	<2	High---------	0.32	
	25-30	0.06-0.2	0.08-0.16	6.1-8.4	<2	High---------	0.32	
	30-35	---	---	---	---	----------	---	

See footnote at end of table.

TABLE 17--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors	
							K	T
	In	In/hr	In/in	pH	Mmhos/cm			
53*:								
Tuskahoma-------	0-4	0.2-2.0	0.15-0.24	5.6-7.8	<2	Low----------	0.49	1
	4-10	<0.06	0.08-0.20	5.1-7.3	<2	High----------	0.37	
	10-16	<0.06	0.05-0.15	5.6-7.8	<2	High----------	0.32	
	16-20	---	---	---	---	----------	---	
54----------	0-9	0.6-2.0	0.15-0.20	5.1-7.3	<2	Low----------	0.37	5
Speer	9-15	0.6-2.0	0.11-0.20	4.5-6.0	<2	Low----------	0.32	
	15-55	0.6-2.0	0.12-0.20	4.5-6.0	<2	Low----------	0.32	
	55-72	0.6-2.0	0.11-0.20	4.5-6.5	<2	Low----------	0.27	
55*:								
Tuskahoma-------	0-4	0.2-2.0	0.15-0.24	5.6-7.8	<2	Low----------	0.49	1
	4-12	<0.06	0.08-0.20	5.1-7.3	<2	High----------	0.37	
	12-18	<0.06	0.05-0.15	5.6-7.8	<2	High----------	0.32	
	18-25	---	---	---	---	----------	---	
Clebit----------	0-5	2.0-6.0	0.06-0.10	5.1-6.5	<2	Low----------	0.20	1
	5-12	2.0-6.0	0.06-0.10	4.5-6.5	<2	Low----------	0.20	
	12-15	---	---	---	---	----------	---	
Sobol----------	0-6	0.6-2.0	0.15-0.24	5.1-6.0	<2	Low----------	0.43	3
	6-13	0.2-0.6	0.15-0.20	4.5-6.5	<2	Moderate-----	0.37	
	13-24	0.06-0.2	0.12-0.18	4.5-6.5	<2	High----------	0.32	
	24-32	0.06-0.2	0.08-0.16	6.1-8.4	<2	High----------	0.32	
	32-37	---	---	---	---	----------	---	
56*. Udorthents								
57*:								
Wister----------	0-9	0.6-2.0	0.16-0.24	4.5-6.0	<2	Low----------	0.43	4
	9-52	<0.06	0.14-0.22	4.5-8.4	<2	High----------	0.37	
	52-60	---	---	---	---	----------	---	
Burwell---------	0-26	0.6-2.0	0.15-0.20	5.1-6.0	<2	Low----------	0.43	5
	26-42	0.2-0.6	0.15-0.20	5.1-7.3	<2	Moderate-----	0.37	
	42-64	0.06-0.2	0.12-0.20	5.6-8.4	<2	High----------	0.32	
58*:								
Wister----------	0-14	0.6-2.0	0.16-0.24	4.5-6.0	<2	Low----------	0.43	4
	14-52	<0.06	0.14-0.22	4.5-8.4	<2	High----------	0.37	
	52-60	---	---	---	---	----------	---	
Burwell---------	0-24	0.6-2.0	0.15-0.20	5.1-6.0	<2	Low----------	0.43	5
	24-38	0.2-0.6	0.15-0.20	5.1-7.3	<2	Moderate-----	0.37	
	38-65	0.06-0.2	0.12-0.20	5.6-8.4	<2	High----------	0.32	
59*:								
Wrightsville----	0-11	0.2-0.6	0.16-0.24	3.6-5.5	<2	Low----------	0.49	5
	11-48	<0.06	0.14-0.22	3.6-5.5	<2	High----------	0.37	
	48-60	<0.06	0.14-0.22	3.6-8.4	<2	High----------	0.43	
Elysian---------	0-26	2.0-6.0	0.11-0.20	4.5-6.5	<2	Low----------	0.37	5
	26-65	0.6-2.0	0.15-0.20	4.5-6.0	<2	Low----------	0.37	
60----------	0-9	0.6-2.0	0.08-0.17	5.6-6.5	<2	Low----------	0.32	5
Yanush	9-14	0.6-2.0	0.08-0.11	4.5-6.0	<2	Moderate-----	0.28	
	14-75	0.6-2.0	0.05-0.11	4.5-6.0	<2	Moderate-----	0.28	
61----------	0-16	0.6-2.0	0.08-0.17	5.6-6.5	<2	Low----------	0.32	5
Yanush	16-20	0.6-2.0	0.08-0.11	4.5-6.0	<2	Moderate-----	0.28	
	20-70	0.6-2.0	0.05-0.11	4.5-6.0	<2	Moderate-----	0.28	
62----------	0-8	0.6-2.0	0.08-0.17	5.6-6.5	<2	Low----------	0.32	5
Yanush	8-13	0.6-2.0	0.08-0.11	4.5-6.0	<2	Moderate-----	0.28	
	13-70	0.6-2.0	0.05-0.11	4.5-6.0	<2	Moderate-----	0.28	

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 18.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the Glossary explain terms such as "rare," "brief," "apparent," and "perched." The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					Ft			In		In			
1---------- Alikchi	B	None	---	---	0.0-1.0	Perched	Nov-Apr	20-40	Ripable	---	---	High	Moderate.
2---------- Alikchi variant	B	None	---	---	0.0-1.0	Perched	Nov-Apr	40-60	Ripable	---	---	High	Moderate.
3, 4---------- Bernow	B	None	---	---	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
5*:													
Bernow----------	B	None	---	---	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
Romia----------	B	None	---	---	>6.0	---	---	40-60	Ripable	---	---	High	High.
6*:													
Bernow----------	B	None	---	---	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
Bosville----------	D	None	---	---	1.0-2.0	Perched	Feb-Jul	>60	---	---	---	High	High.
Romia----------	B	None	---	---	>6.0	---	---	40-60	Ripable	---	---	High	High.
7*:													
Bigfork----------	C	None	---	---	>6.0	---	---	20-40	Hard	---	---	Moderate	High.
Yanush----------	C	None	---	---	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
8---------- Boggy	C	Frequent	Very brief	Jan-May	0.0-2.0	Apparent	Nov-Apr	>60	---	---	---	Moderate	Moderate.
9, 10---------- Bosville	D	None	---	---	1.0-2.0	Perched	Feb-Jul	>60	---	---	---	High	High.
11*, 12*:													
Carnasaw----------	C	None	---	---	>6.0	---	---	30-60	Ripable	---	---	High	High.
Pirum----------	B	None	---	---	>6.0	---	---	22-50	Hard	---	---	Low	High.
Clebit----------	D	None	---	---	>6.0	---	---	10-20	Hard	---	---	Low	Moderate.
13*, 14*:													
Carnasaw----------	C	None	---	---	>6.0	---	---	30-60	Ripable	---	---	High	High.
Stapp----------	C	None	---	---	1.0-3.0	Perched	Nov-Apr	40-60	Ripable	---	---	High	High.

See footnote at end of table.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					Ft			In		In			
15---------- Ceda	B	Occasional--	Very brief	Jan-May	>6.0	---	---	>60	---	---	---	Low-------	Moderate.
16---------- Ceda	B	Frequent----	Very brief	Jan-May	>6.0	---	---	>60	---	---	---	Low-------	Moderate.
17*: Ceda----------	B	Frequent----	Very brief	Jan-May	>6.0	---	---	>60	---	---	---	Low-------	Moderate.
Rubble land.													
18*, 19*: Clebit----------	D	None--------	---	---	>6.0	---	---	10-20	Hard	---	---	Low-------	Moderate.
Pirum----------	B	None--------	---	---	>6.0	---	---	22-50	Hard	---	---	Low-------	High.
Carnasaw---------	C	None--------	---	---	>6.0	---	---	30-60	Rippable	---	---	High------	High.
20*: Clebit----------	D	None--------	---	---	>6.0	---	---	10-20	Hard	---	---	Low-------	Moderate.
Rock outcrop.													
21---------- Dela	B	Occasional--	Very brief	Nov-May	3.0-5.0	Apparent	Nov-May	>60	---	---	---	Moderate	Moderate.
22---------- Dela	B	Frequent----	Very brief	Nov-May	3.0-5.0	Apparent	Nov-May	>60	---	---	---	Moderate	Moderate
23, 24---------- Glenpool	B	None--------	---	---	>6.0	---	---	>60	---	---	---	Low-------	High.
25---------- Guyton	D	Occasional--	Very brief	Jan-Dec	0.0-1.5	Apparent	Dec-May	>60	---	---	---	High------	Moderate.
26*: Guyton----------	D	Occasional--	Very brief	Jan-Dec	0.0-1.5	Apparent	Dec-May	>60	---	---	---	High------	Moderate.
Elysian----------	B	None--------	---	---	3.0-6.0	Perched	Dec-May	>60	---	---	---	Moderate	High.
27---------- Hamden	B	None--------	---	---	0.5-1.5	Perched	Nov-Apr	>60	---	---	---	High------	High.
28*: Hollywood--------	D	None--------	---	---	>6.0	---	---	>48	Hard	---	---	High------	Low.
Swink----------	D	None--------	---	---	>6.0	---	---	8-20	Hard	---	---	High------	Low.
29*: Honobia----------	C	None--------	---	---	>6.0	---	---	20-40	Rippable	---	---	High------	Moderate.
Nashoba----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	---	---	Low-------	Moderate.
30---------- Kullit	B	None--------	---	---	2.0-3.0	Apparent	Dec-May	>60	---	---	---	High------	High.

See footnote at end of table.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					Ft			In		In			
31, 32---------- Larue	A	None---------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
33*, 34*: Moyers----------	C	None---------	---	---	1.0-2.0	Perched	Nov-Apr	40-60	Ripable	---	---	High-----	Moderate.
Burwell----------	C	None---------	---	---	2.0-3.0	Perched	Nov-Apr	>60	---	---	---	High-----	Moderate.
35*: Moyers----------	C	None---------	---	---	1.0-2.0	Perched	Nov-Apr	40-60	Ripable	---	---	High-----	Moderate.
Wister----------	C	None---------	---	---	1.0-2.0	Perched	Nov-May	40-60	Ripable	---	---	High-----	Moderate.
Burwell----------	C	None---------	---	---	2.0-3.0	Perched	Nov-Apr	>60	---	---	---	High-----	Moderate.
36---------- Nahatche variant	C	Frequent----	Very brief	Jan-May	0.0-1.0	Apparent	Nov-Jun	>60	---	---	---	Moderate	Moderate.
37---------- Pushmataha	C	Occasional--	Very brief	Jan-May	0.0-3.0	Apparent	Nov-Apr	>60	---	---	---	Moderate	Moderate.
38*: Pushmataha-------	C	Frequent----	Very brief	Jan-May	0.0-3.0	Apparent	Nov-Apr	>60	---	---	---	Moderate	Moderate.
Elysian----------	B	None---------	---	---	3.0-6.0	Perched	Dec-May	>60	---	---	---	Moderate	High.
Guyton----------	D	Frequent----	Very brief	Jan-Dec	0.0-1.5	Apparent	Dec-May	>60	---	---	---	High-----	Moderate.
39---------- Rexor	A	Occasional--	Very brief	Nov-May	3.0-4.0	Apparent	Nov-May	>60	---	---	---	Moderate	Moderate.
40, 41, 42, 43---- Ruston	B	None---------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
44, 45---------- Saffell	B	None---------	---	---	>6.0	---	---	>60	---	---	---	Low------	Moderate.
46, 47, 48-------- Shermore	B	None---------	---	---	1.0-2.5	Perched	Nov-May	>60	---	---	---	Moderate	Moderate.
49*, 50*: Sherwood---------	B	None---------	---	---	>6.0	---	---	30-60	Hard	---	---	Moderate	Moderate.
Zafra----------	B	None---------	---	---	>6.0	---	---	25-60	Hard	---	---	Moderate	High.
51---------- Smithdale	B	None---------	---	---	>6.0	---	---	>60	---	---	---	Low------	Moderate.
52---------- Sobol	C	None---------	---	---	0.5-1.5	Perched	Nov-Apr	20-40	Ripable	---	---	High-----	High.

See footnote at end of table.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					Ft			In		In			
53*:													
Sobol	C	None	---	---	0.5-1.5	Perched	Nov-Apr	20-40	Rippable	---	---	High	High.
Tuskahoma	D	None	---	---	0.5-1.5	Perched	Nov-Apr	10-20	Rippable	---	---	High	Moderate.
54---------- Speer	C	Rare	Very brief	Jan-May	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
55*:													
Tuskahoma	D	None	---	---	0.5-1.5	Perched	Nov-Apr	10-20	Rippable	---	---	High	Moderate.
Clebit	D	None	---	---	>6.0	---	---	10-20	Hard	---	---	Low	Moderate.
Sobol	C	None	---	---	0.5-1.5	Perched	Nov-Apr	20-40	Rippable	---	---	High	High.
56*. Udorthents													
57*, 58*:													
Wister	C	None	---	---	1.0-2.0	Perched	Nov-May	40-60	Rippable	---	---	High	Moderate.
Burwell	C	None	---	---	2.0-3.0	Perched	Nov-Apr	>60	---	---	---	High	Moderate.
59*:													
Wrightsville	D	None	---	---	0.6-1.5	Perched	Dec-Apr	>60	---	---	---	High	High.
Elysian	B	None	---	---	3.0-6.0	Perched	Dec-May	>60	---	---	---	Moderate	High.
60, 61, 62-------- Yanush	C	None	---	---	>6.0	---	---	>60	---	---	---	Moderate	Moderate.

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 19.--ENGINEERING TEST DATA

[Dashes indicate data were not available. NP means nonplastic]

Soil name, report number, horizon, and depth in inches	Classification		Grain size distribution							Liquid limit	Plasticity index	Moisture density		Shrinkage		
			Percentage passing sieve				Percentage smaller than--									
	AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Max. dry density	Optimum moisture	Limit	Linear	Ratio
										Pct		Lb/Ft^3	Pct	Pct	Pct	Pct
Bernow fsl:[1] (S75OK-127-005)																
A2------- 5 to 10	A-4 (00)	ML	100	100	99	52	--	5	3	--	NP	--	--	--	0.0	--
B22t-----20 to 38	A-6 (07)	CL	100	100	100	69	--	26	24	30	13	--	--	13.0	0.0	1.9
B&A'2----56 to 80	A-4 (04)	CL	100	100	100	68	--	25	23	25	10	--	--	12.0	0.0	1.8
Dela fsl:[2] (S75OK-127-002)																
Ap&a1---- 0 to 15	A-4 (00)	ML	100	100	100	61	--	7	3	--	NP	--	--	--	0.0	--
C1-------15 to 33	A-4 (00)	ML	100	100	100	61	--	15	11	--	NP	--	--	--	0.0	--
C3-------46 to 80	A-4 (00)	SM	100	100	100	50	--	11	10	--	NP	--	--	--	0.0	--
Wister sil:[3] (S75OK-127-001)																
A1------- 0 to 10	A-4 (02)	ML	100	100	97	72	--	13	10	27	5	--	--	16.0	0.0	1.7
B22t-----19 to 33	A-7-6(28)	CH	100	100	99	88	--	57	49	52	29	--	--	11.0	0.0	2.0
Cr-------55 to 75	A-6 (16)	CL	100	100	100	96	--	68	43	37	16	--	--	15.0	0.0	1.8

[1]Bernow fine sandy loam:
920 feet north and 420 feet west of the southwest corner of sec. 16, T. 4 S., R. 16 E.

[2]Dela fine sandy loam:
1360 feet west and 400 feet north of the southeast corner of sec. 14, T. 4 S., R. 17 E.

[3]Wister sandy loam:
75 feet east of the northwest corner of sec. 33, T. 2 S., R. 15 E.

TABLE 20.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil or certain map units of the series are taxadjuncts to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Alikchi	Fine-silty, siliceous, thermic Typic Glossaqualfs
Alikchi variant	Fine-silty, siliceous, thermic Typic Glossaqualfs
Bernow	Fine-loamy, siliceous, thermic Glossic Paleudalfs
Bigfork	Loamy-skeletal, siliceous, thermic Typic Hapludults
Boggy	Coarse-loamy, siliceous, nonacid, thermic Aeric Fluvaquents
Bosville	Fine, mixed, thermic Albaquic Paleudalfs
Burwell	Fine-silty, mixed, thermic Aquic Paleudolls
Carnasaw	Clayey, mixed, thermic Typic Hapludults
*Ceda	Loamy-skeletal, siliceous, nonacid, thermic Typic Udifluvents
Clebit	Loamy-skeletal, siliceous, thermic Lithic Dystrochrepts
Dela	Coarse-loamy, siliceous, nonacid, thermic Typic Udifluvents
*Elysian	Coarse-loamy, siliceous, thermic Haplic Glossudalfs
Glenpool	Sandy, siliceous, thermic Psammentic Paleudalfs
*Guyton	Fine-silty, siliceous, thermic Typic Glossaqualfs
Hamden	Fine-loamy, siliceous, thermic Aquic Paleudalfs
Hollywood	Fine, montmorillonitic, thermic Typic Pelluderts
Honobia	Clayey-skeletal, mixed, thermic Typic Hapludults
Kullit	Fine-loamy, siliceous, thermic Aquic Paleudults
Larue	Loamy, siliceous, thermic Arenic Paleudalfs
Moyers	Fine, mixed, thermic Aquollic Hapludalfs
Nahatche variant	Fine-loamy, mixed, nonacid, thermic Aeric Fluvaquents
Nashoba	Loamy-skeletal, siliceous, thermic Typic Dystrochrepts
Pirum	Fine-loamy, siliceous, thermic Typic Hapludults
Pushmataha	Coarse-silty, siliceous, nonacid, thermic Aquic Udifluvents
Rexor	Fine-silty, siliceous, thermic Ultic Hapludalfs
Romia	Fine-loamy, siliceous, thermic Ultic Hapludalfs
Ruston	Fine-loamy, siliceous, thermic Typic Paleudults
Saffell	Loamy-skeletal, siliceous, thermic Typic Hapludults
Shermore	Fine-loamy, siliceous, thermic Aquic Paleudults
Sherwood	Fine-loamy, mixed, thermic Typic Hapludults
Smithdale	Fine-loamy, siliceous, thermic Typic Paleudults
Sobol	Fine, mixed, thermic Aquic Hapludalfs
Speer	Fine-loamy, siliceous, thermic Ultic Hapludalfs
Stapp	Clayey, mixed, thermic Aquic Hapludults
Swink	Clayey-skeletal, montmorillonitic, thermic Lithic Hapludolls
Tuskahoma	Clayey, mixed, thermic, shallow Albaquic Hapludalfs
Wister	Fine, mixed, thermic Albaquic Hapludalfs
Wrightsville	Fine, mixed, thermic Typic Glossaqualfs
Yanush	Loamy-skeletal, siliceous, thermic Typic Paleudalfs
Zafra	Loamy-skeletal, siliceous, thermic Typic Hapludults

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GENERAL SOIL MAP
PUSHMATAHA COUNTY, OKLAHOMA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
OKLAHOMA AGRICULTURAL EXPERIMENT STATION

Compiled 1979

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

N

LEGEND

1 BERNOW-LARUE-ROMIA: Deep, nearly level to strongly sloping, well drained soils that have a loamy or sandy surface layer and a loamy subsoil; on uplands

2 DELA-GUYTON-PUSHMATAHA: Deep, nearly level to very gently sloping, moderately well drained, poorly drained and somewhat poorly drained soils that have a loamy surface layer and a loamy or sandy underlying layer; on flood plains and stream terraces

3 TUSKAHOMA-SHERWOOD-CLEBIT: Shallow and deep, gently sloping to steep, moderately well drained and well drained soils that have a loamy surface layer and a loamy or clayey subsoil; on uplands

4 CARNASAW-PIRUM-CLEBIT: Deep, moderately deep, and shallow, strongly sloping to steep, well drained soils that have a loamy surface layer and a clayey or loamy subsoil; on uplands

5 HONOBIA-NASHOBA: Moderately deep, strongly sloping, well drained soils that have a loamy surface layer and a clayey or loamy subsoil; on uplands

6 SOBOL-TUSKAHOMA-WISTER: Moderately deep, shallow, and deep, nearly level to strongly sloping, moderately well drained soils that have a loamy surface layer and a clayey subsoil; on uplands

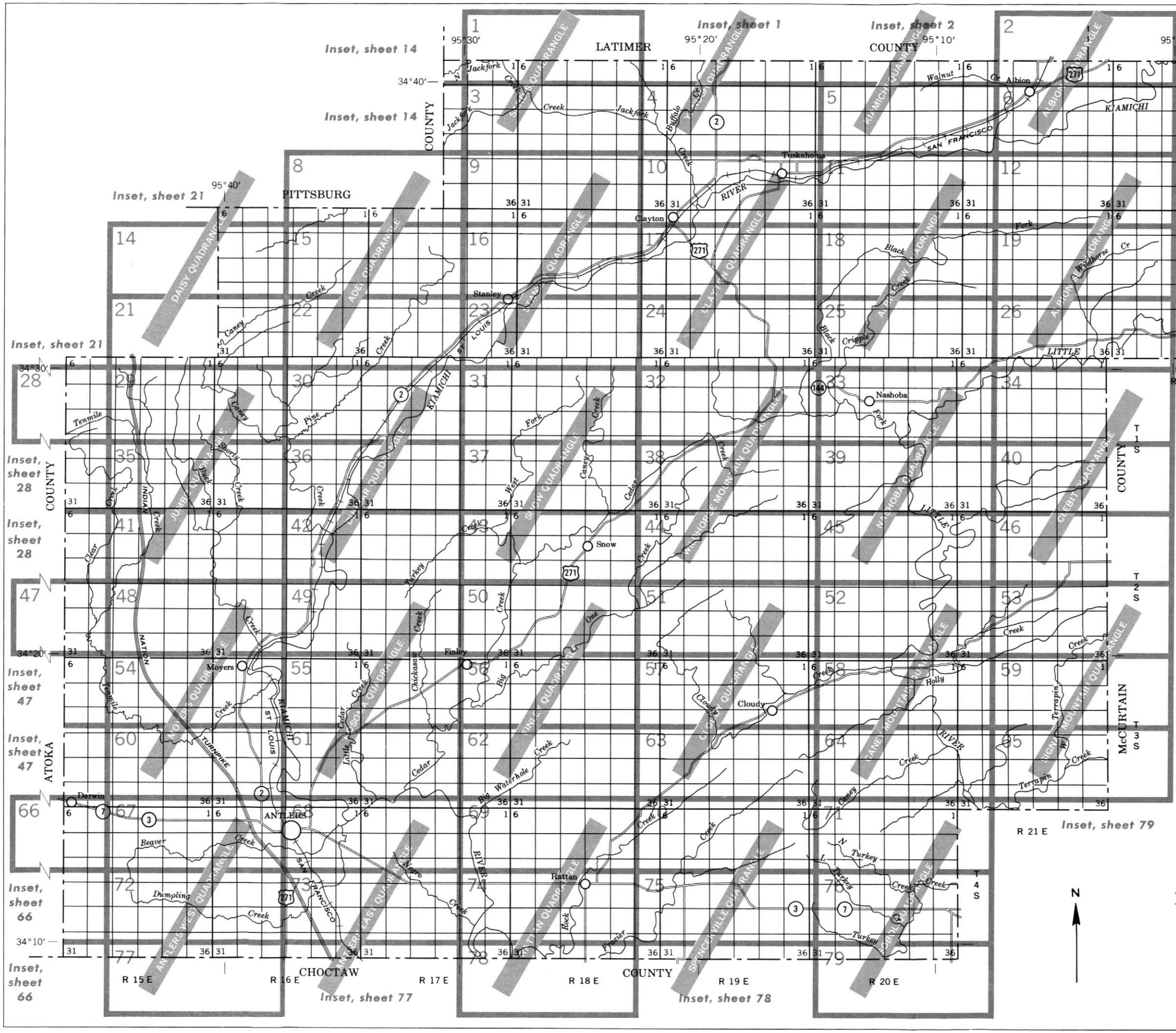
7 YANUSH-BIGFORK: Deep and moderately deep, very gently sloping to steep, well drained cherty and stoney soils that have a loamy surface layer and a loamy subsoil; on uplands

8 RUSTON-BOGGY-SAFFELL: Deep, nearly level to moderately steep, well drained and somewhat poorly drained soils that have a loamy or sandy surface layer and a loamy subsoil or underlying layer; on uplands and flood plains

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Original text from each individual map sheet read:

This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1977 orthophotography obtained from U.S. Department of the Interior, Geological Survey.

INDEX TO MAP SHEETS

PUSHMATAHA COUNTY, OKLAHOMA

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

N

SOIL LEGEND

The map symbols are numeric. Soil names that do not give a slope range are for level or nearly level soils. The soil name followed by the superscript 1/ designates a broadly defined mapping unit and the composition of these mapping units are more variable than other mapping units in the survey area. Mapping has been controlled well enough for the anticipated use of the soils.

SYMBOL	NAME
1	Alikchi loam, 1 to 3 percent slopes
2	Alikchi Variant silt loam, 0 to 2 percent slopes
3	Bernow fine sandy loam, 1 to 3 percent slopes
4	Bernow fine sandy loam, 3 to 5 percent slopes
5	Bernow-Romia complex, 8 to 12 percent slopes
6	Bernow, Bosville, and Romia soils, gullied 1/
7	Bigfork-Yanush association, steep 1/
8	Boggy fine sandy loam
9	Bosville fine sandy loam, 3 to 5 percent slopes
10	Bosville fine sandy loam, 5 to 12 percent slopes
11	Carnasaw-Pirum-Clebit association, moderately steep 1/
12	Carnasaw-Pirum-Clebit association, dry, moderately steep 1/
13	Carnasaw-Stapp association, strongly sloping 1/
14	Carnasaw-Stapp association, dry, strongly sloping 1/
15	Ceda cherty silt loam, occasionally flooded
16	Ceda cherty silt loam, frequently flooded
17	Ceda-Rubble land complex
18	Clebit-Pirum-Carnasaw association, steep 1/
19	Clebit-Pirum-Carnasaw association, dry, steep 1/
20	Clebit-Rock outcrop association, steep 1/
21	Dela fine sandy loam, occasionally flooded
22	Dela fine sandy loam, frequently flooded
23	Glenpool loamy fine sand, 0 to 3 percent slopes
24	Glenpool loamy fine sand, 3 to 12 percent slopes
25	Guyton silt loam
26	Guyton-Elysian complex, undulating
27	Hamden fine sandy loam, 0 to 2 percent slopes
28	Hollywood-Swink complex, 2 to 8 percent slopes
29	Honobia-Nashoba association, strongly sloping 1/
30	Kullit fine sandy loam, 0 to 2 percent slopes
31	Larue loamy fine sand, 0 to 3 percent slopes
32	Larue loamy fine sand, 3 to 8 percent slopes
33	Moyers-Burwell complex, 1 to 3 percent slopes
34	Moyers-Burwell complex, 3 to 5 percent slopes
35	Moyers, Wister, and Burwell soils, gullied
36	Nahatche Variant sandy loam
37	Pushmataha loam
38	Pushmataha, Elysian, and Guyton soils 1/
39	Rexor loam
40	Ruston loamy fine sand, 0 to 3 percent slopes
41	Ruston loamy fine sand, 3 to 8 percent slopes
42	Ruston fine sandy loam, 1 to 3 percent slopes
43	Ruston fine sandy loam, 3 to 5 percent slopes
44	Saffell gravelly sandy loam, 1 to 5 percent slopes
45	Saffell gravelly sandy loam, 5 to 20 percent slopes
46	Shermore fine sandy loam, 1 to 3 percent slopes
47	Shermore fine sandy loam, 3 to 5 percent slopes
48	Shermore fine sandy loam, 2 to 5 percent slopes, eroded
49	Sherwood-Zafra association, gently sloping 1/
50	Sherwood-Zafra association, sloping 1/
51	Smithdale fine sandy loam, 5 to 12 percent slopes
52	Sobol clay loam, 3 to 5 percent slopes
53	Sobol-Tuskahoma association, strongly sloping
54	Speer loam, 1 to 3 percent slopes
55	Tuskahoma-Clebit-Sobol association, strongly sloping 1/
56	Udorthents
57	Wister-Burwell complex, 0 to 1 percent slopes
58	Wister-Burwell complex, 1 to 3 percent slopes
59	Wrightsville-Elysian complex, undulating
60	Yanush cherty silt loam, 1 to 3 percent slopes
61	Yanush cherty silt loam, 3 to 5 percent slopes
62	Yanush cherty silt loam, 5 to 20 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool (Davis Airstrip; FLOOD POOL LINE)

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate (78)
- Federal (410)
- State (52)
- County, farm or ranch (378)

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small (water; w)

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) (Indian Mound)
- Located object (label) (Tower)
- Tank (label) (GAS)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) (CANAL)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial (water; w)
- Intermittent (int; i)

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS (CeA; FoB2)

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

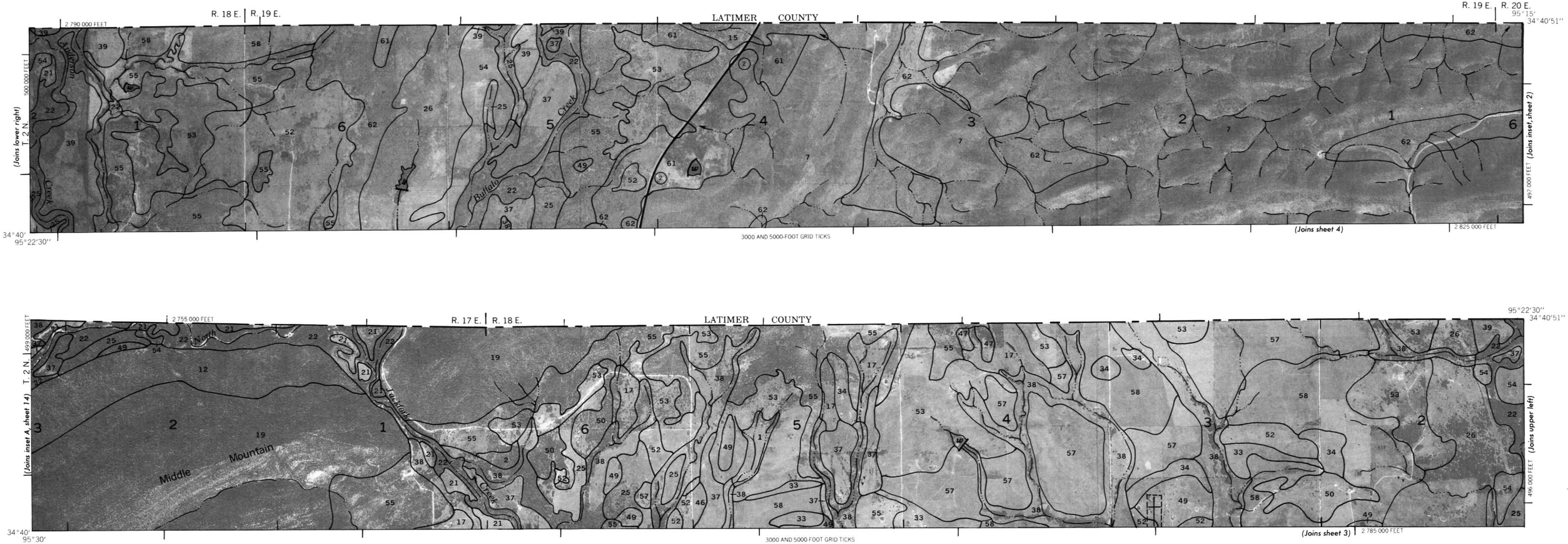
DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

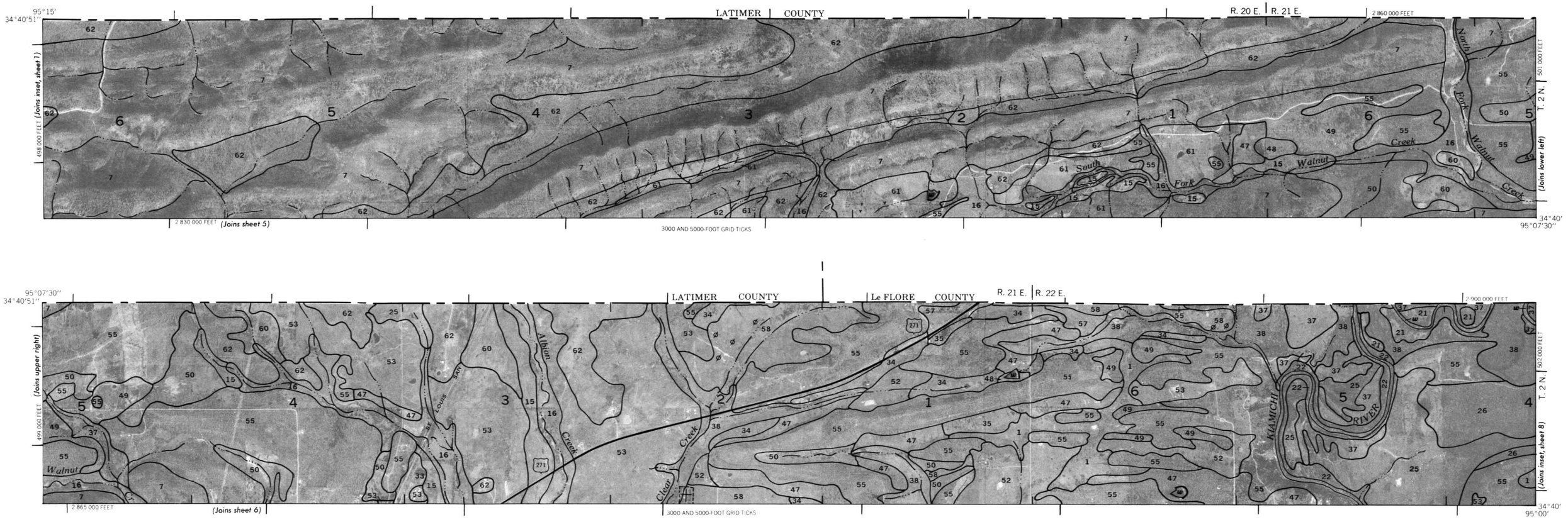
PUSHMATAHA COUNTY, OKLAHOMA — SHEET NUMBER 1



1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000

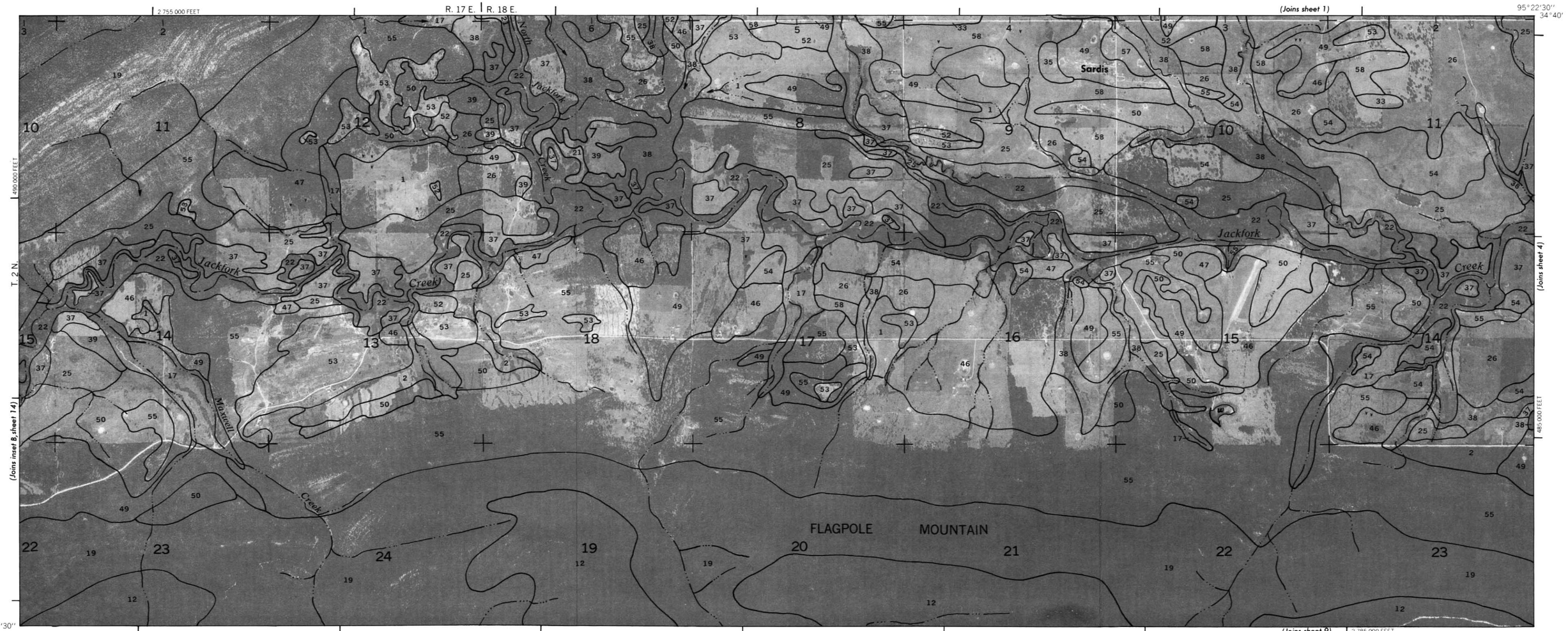


1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24000

N



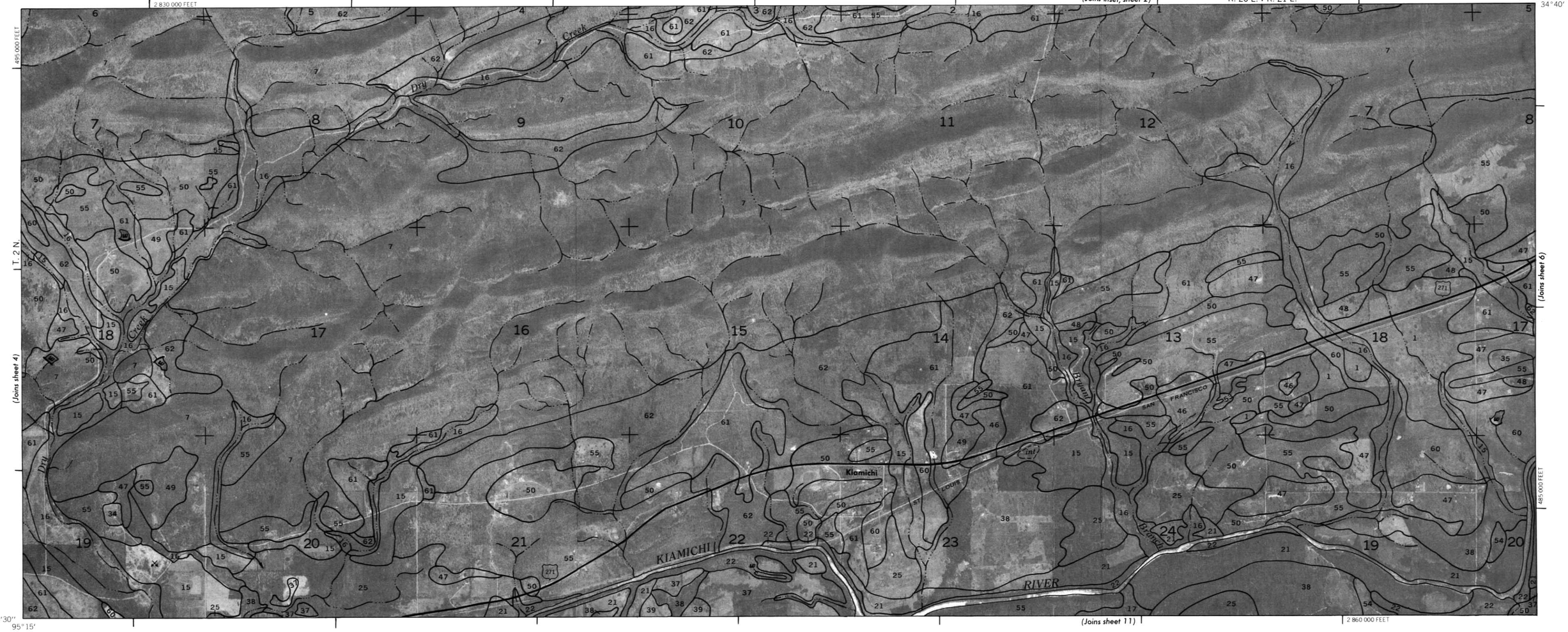
Scale 1:24000

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000

PUSHMATAHA COUNTY, OKLAHOMA — SHEET NUMBER 5



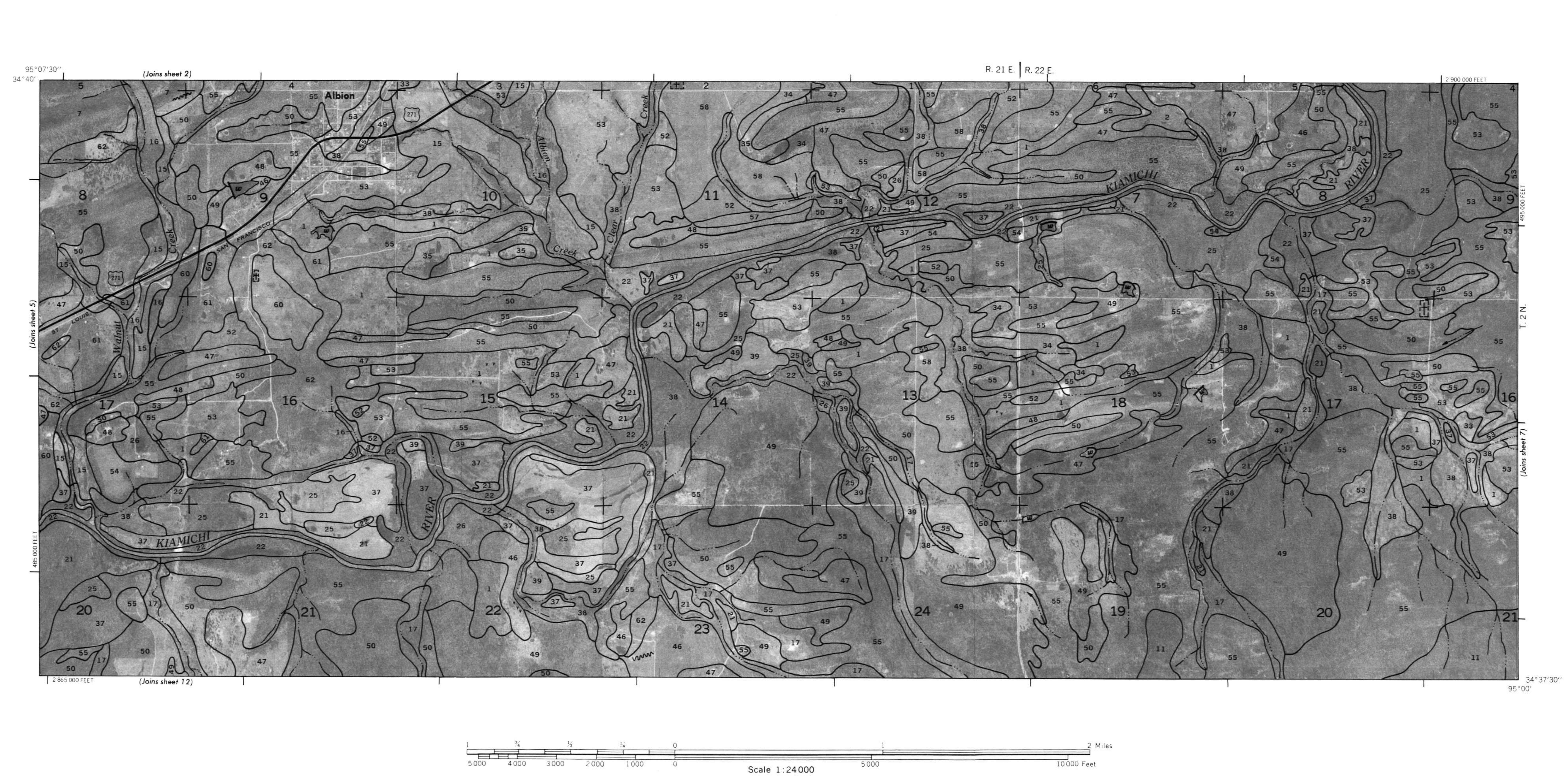
1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

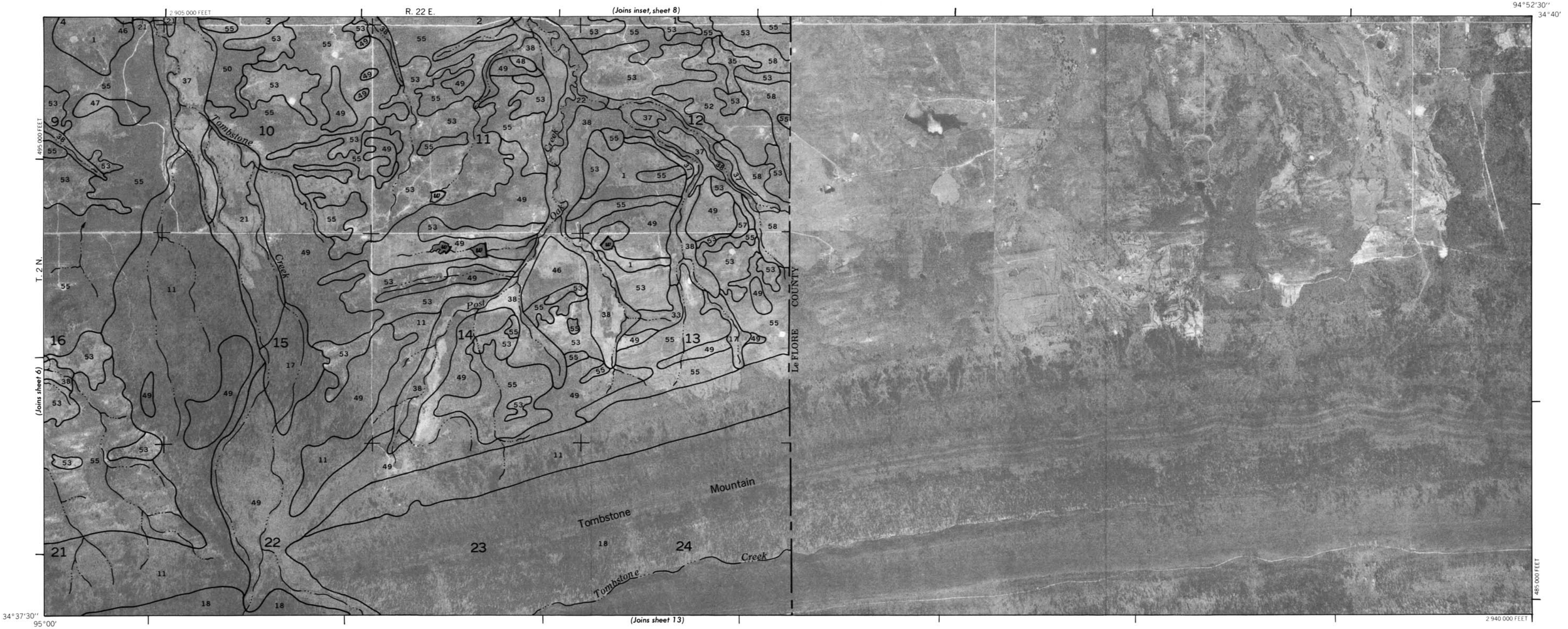
Scale 1:24000

N

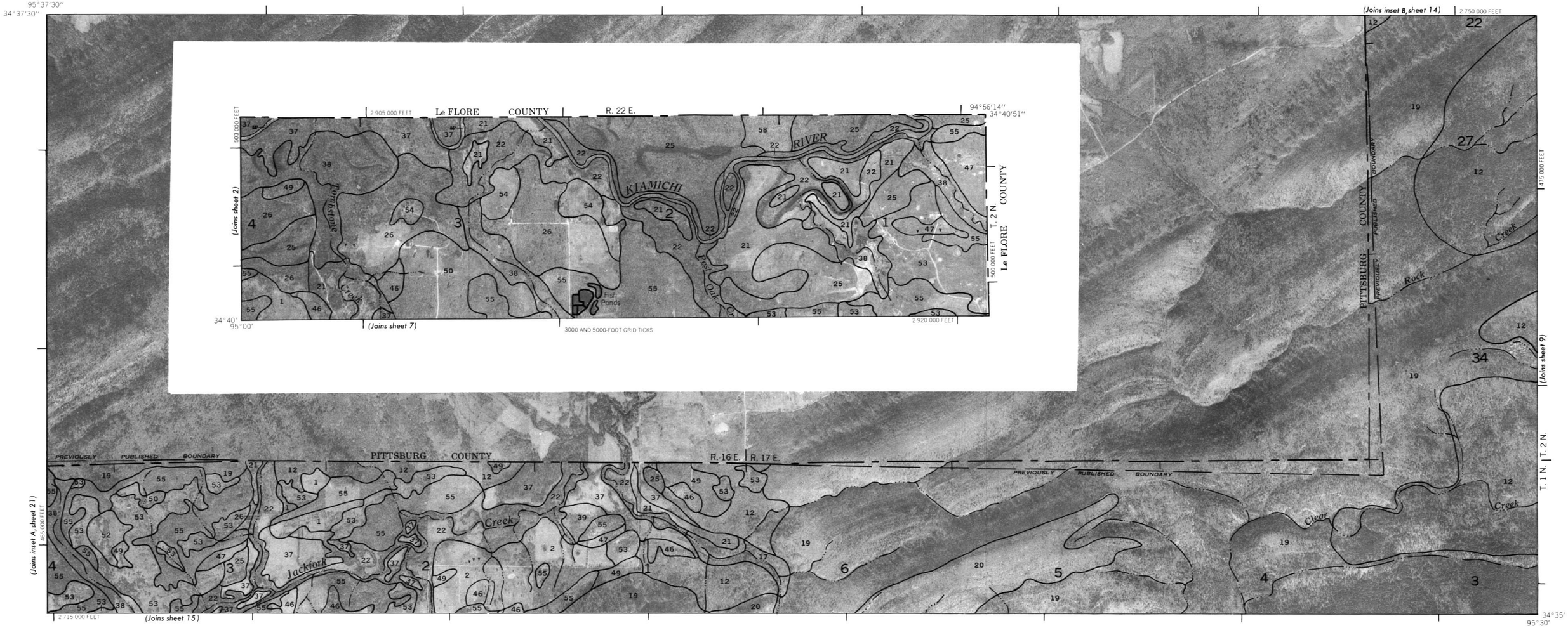
6


N
95°07'30"
34°40'
(Joins sheet 2)
R. 21 E. | R. 22 E.
2 900 000 FEET
Albion
271
ST. LOUIS — SAN FRANCISCO
Walnut Creek
Albion Creek
Clear Creek
KIAMICHI RIVER
(Joins sheet 5)
(Joins sheet 7)
T. 2 N.
495 000 FEET
485 000 FEET
2 865 000 FEET
(Joins sheet 12)
34°37'30"
95°00'
1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

N



Scale 1:24000



Scale 1:24000

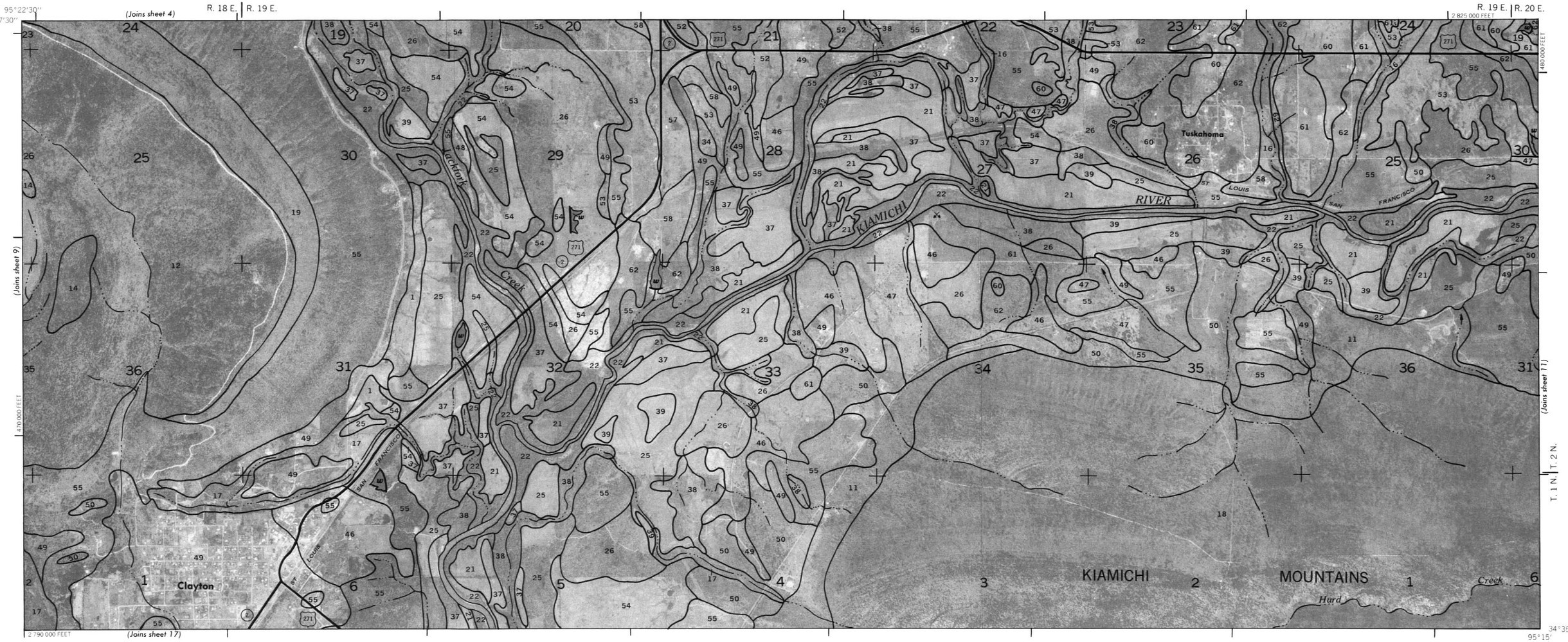
1 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000

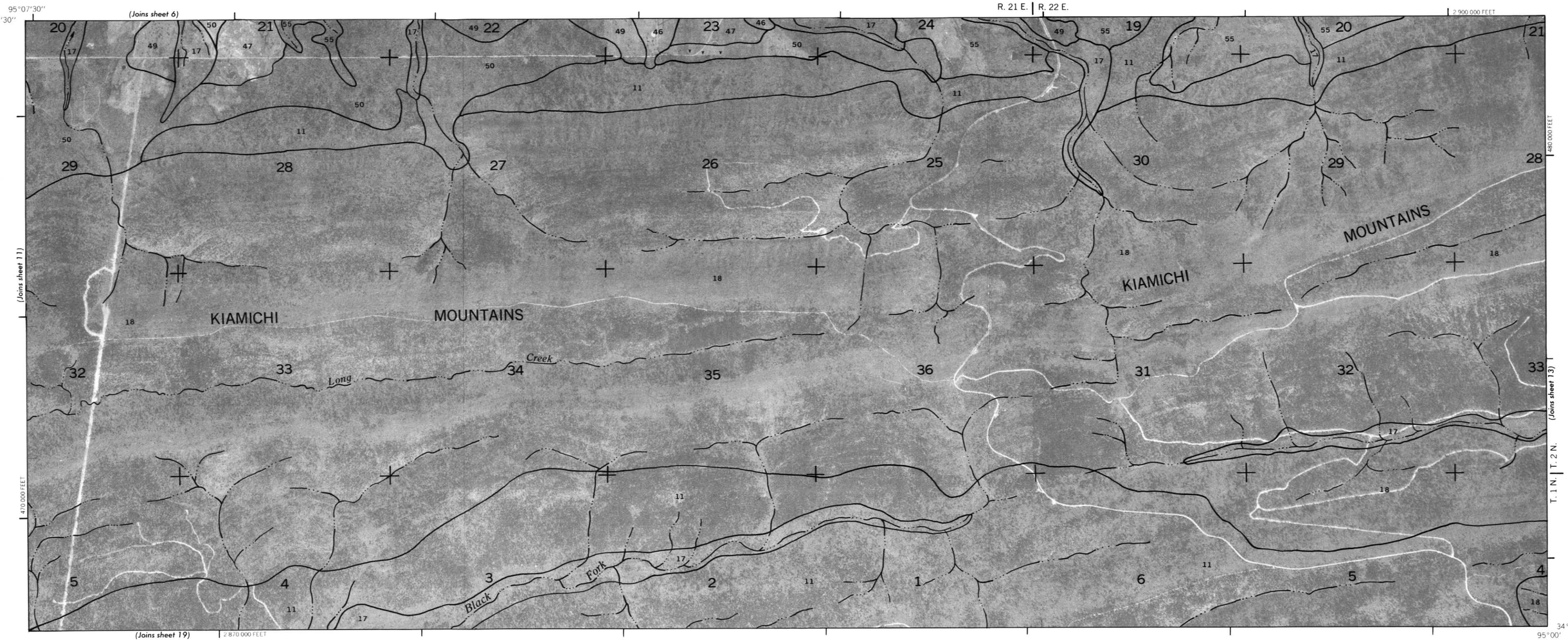


1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000

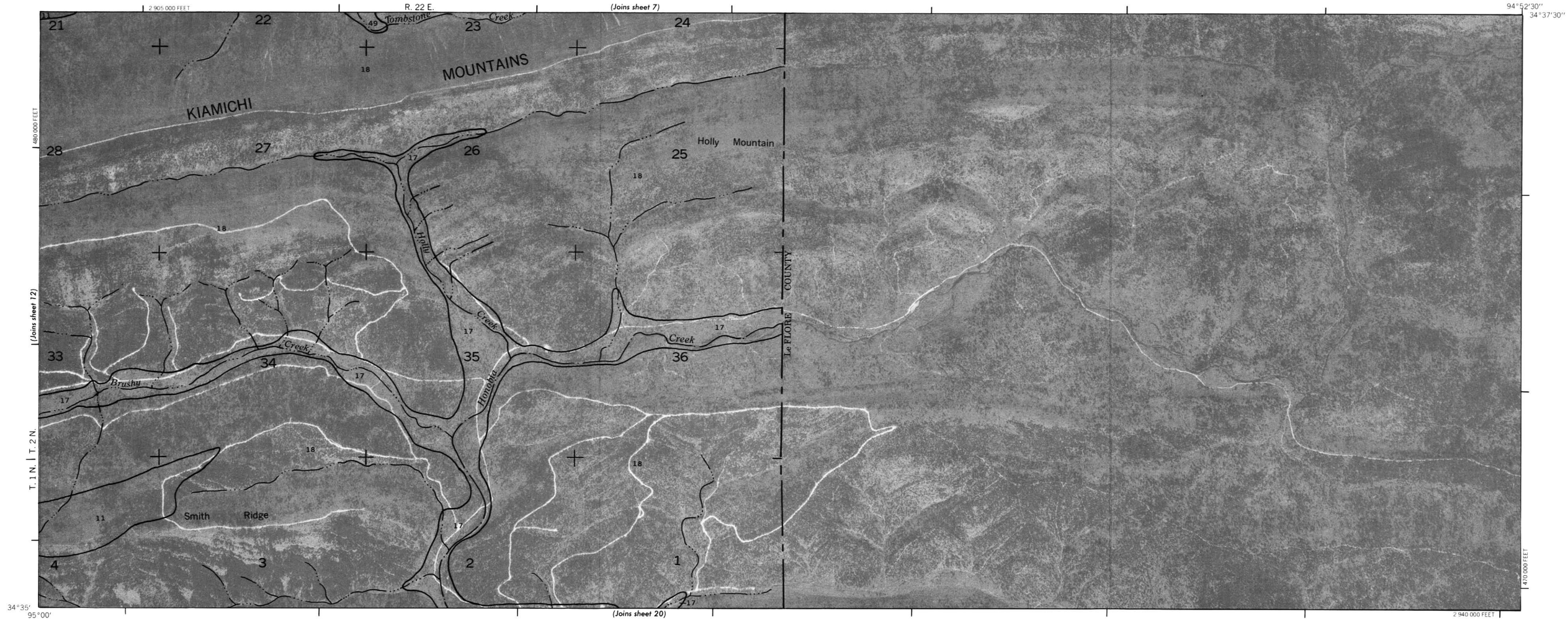
Scale 1:24000



Scale 1:24000

1 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet



1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24000

N

INSET A

95°31'52"

34°42'

R. 17 E.

2 751 000 FEET

505 000 FEET

LATIMER COUNTY

PITTSBURG COUNTY

T. 2 N.

North Jackfork Creek

495 000 FEET

(Joins sheet 1)

2 748 000 FEET (Joins upper right)

34°40'

95°30'

3000 AND 5000-FOOT GRID TICKS

INSET B

95°31'52"

(Joins lower left)

34°40'

R. 17 E.

2 751 000 FEET

490 000 FEET

PITTSBURG COUNTY

T. 2 N.

(Joins sheet 3)

Jackfork Creek

480 000 FEET

2 748 000 FEET (Joins sheet 8)

34°37'30"

95°30'

3000 AND 5000-FOOT GRID TICKS

95°40'18"

34°35'

(Joins inset A, sheet 21)

R. 16 E.

2 710 000 FEET

460 000 FEET

ATOKA COUNTY

T. 1 N.

(Joins sheet 15)

Jackfork Creek

Cole Creek

MOUNTAIN TURKEY

Middle Branch

Dry Branch

Clear Creek

Lone Rock

450 000 FEET

(Joins sheet 21)

2 705 000 FEET

34°32'30"

95°37'30"

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24000

N

Scale 1:24000

N

95°30'
34°35'

(Joins sheet 9)

R. 17 E. | R. 18 E.

2 790 000 FEET

465 000 FEET

(Joins sheet 15)

T. 1 N.

(Joins sheet 17)

450 000 FEET

2 755 000 FEET

(Joins sheet 23)

34°32'30"
95°22'30"

1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000

N

Scale 1:24000

1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

PUSHMATAHA COUNTY, OKLAHOMA — SHEET NUMBER 18

N

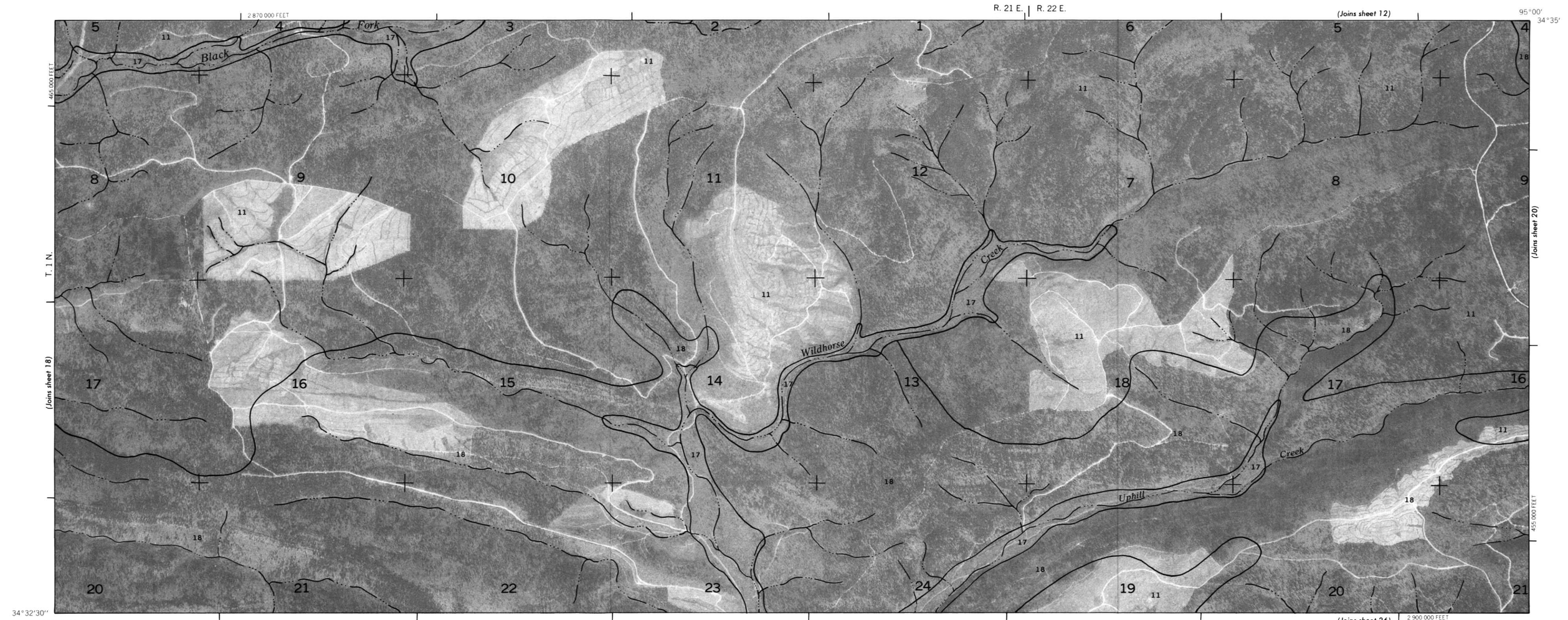
95°15'
34°35'
(Joins sheet 11)
R. 20 E.
R. 21 E.
2 865 000 FEET
465 000 FEET
(Joins sheet 17)
T. 1 N.
(Joins sheet 19)
455 000 FEET
2 830 000 FEET
(Joins sheet 25)
34°32'30"
95°07'30"

Long Creek
Black Fork
Black Fork
Cripple Creek

Scale 1:24000

1 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet

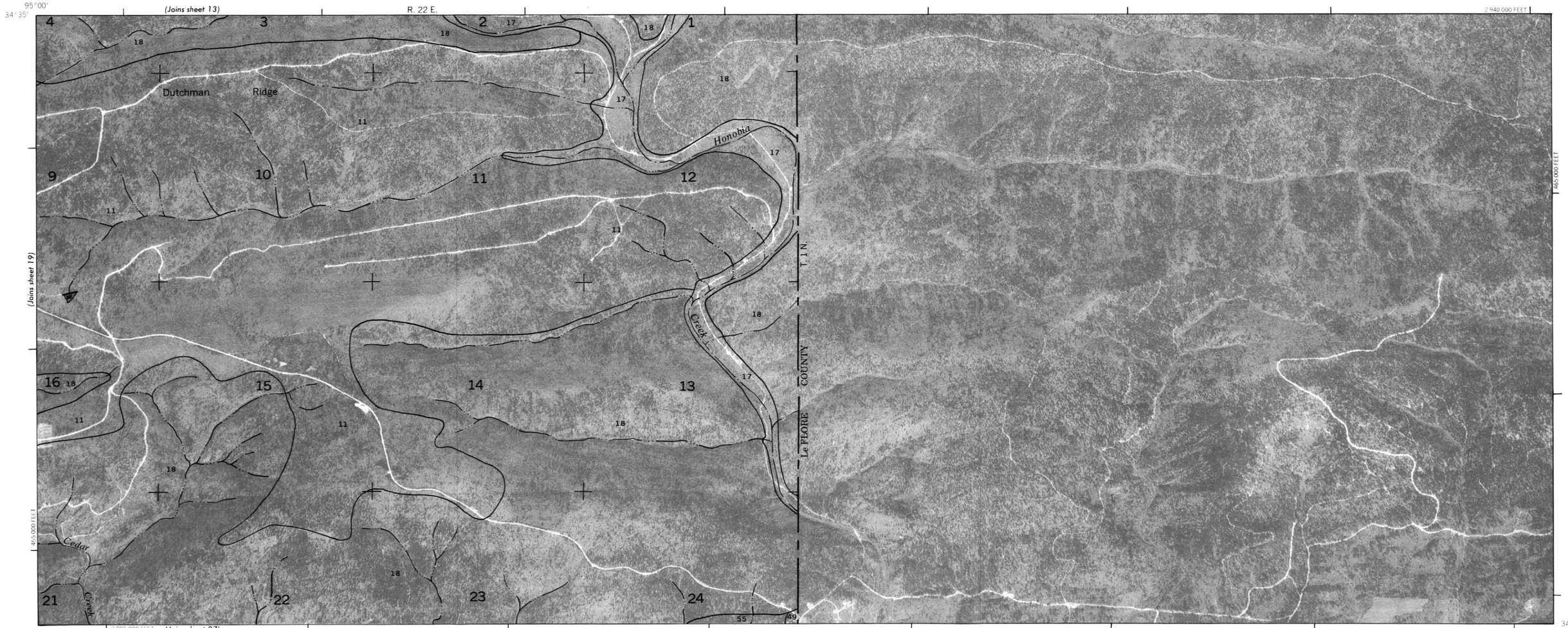
N



1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

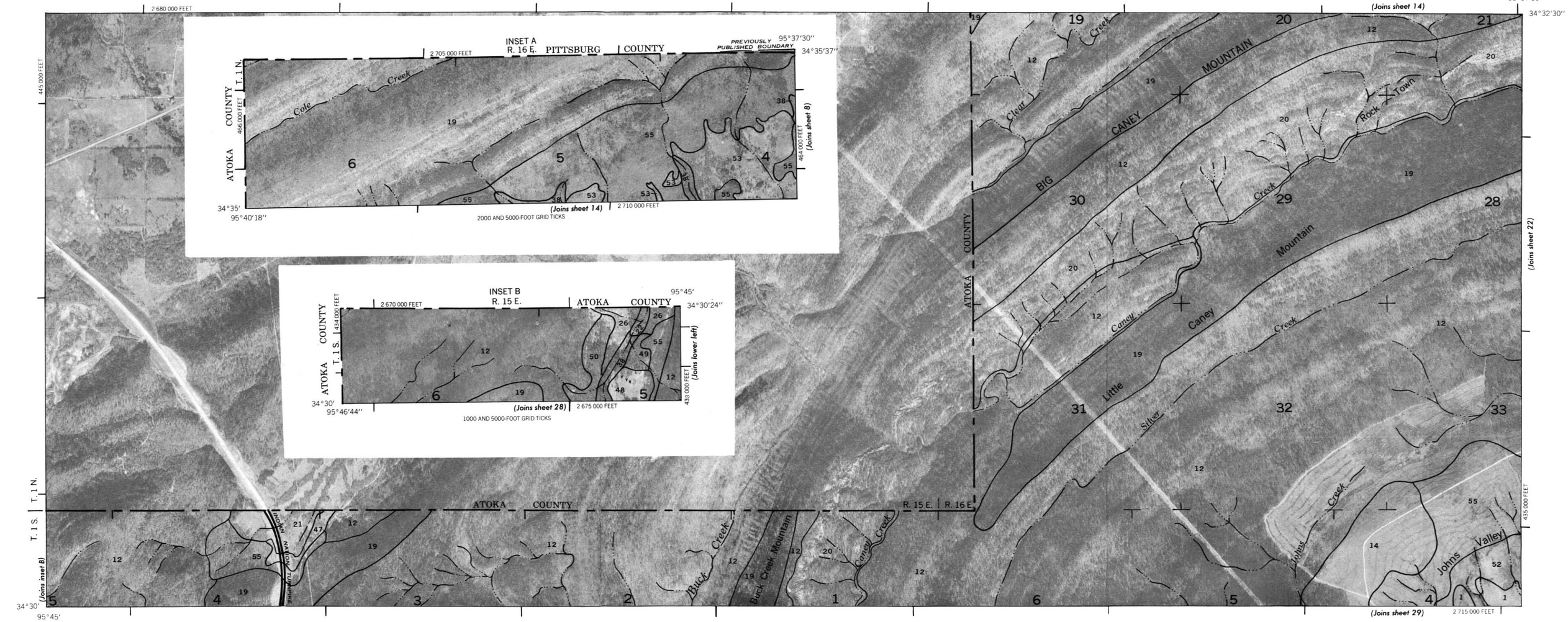
Scale 1:24 000


N
95°00'
34°35'
(Joins sheet 13)
R. 22 E.
2 940 000 FEET
(Joins sheet 19)
Dutchman
Ridge
Honobia
Creek
T. 1 N.
Le FLORE COUNTY
465 000 FEET
455 000 FEET
Cedar
Coyle
2 905 000 FEET
(Joins sheet 27)
34°32'30"
94°52'30"
1 0 1 2 Miles
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
Scale 1:24 000

N

INSET A
R. 16 E.

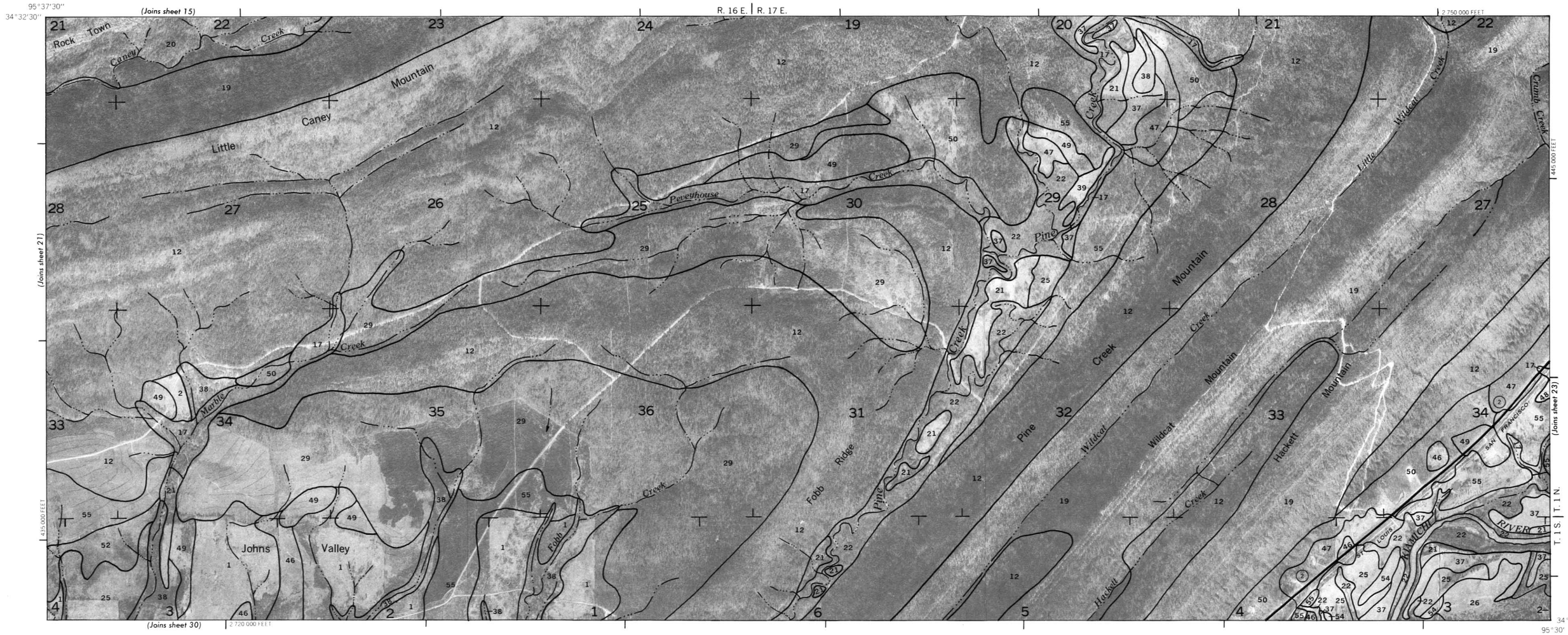
INSET B
R. 15 E.

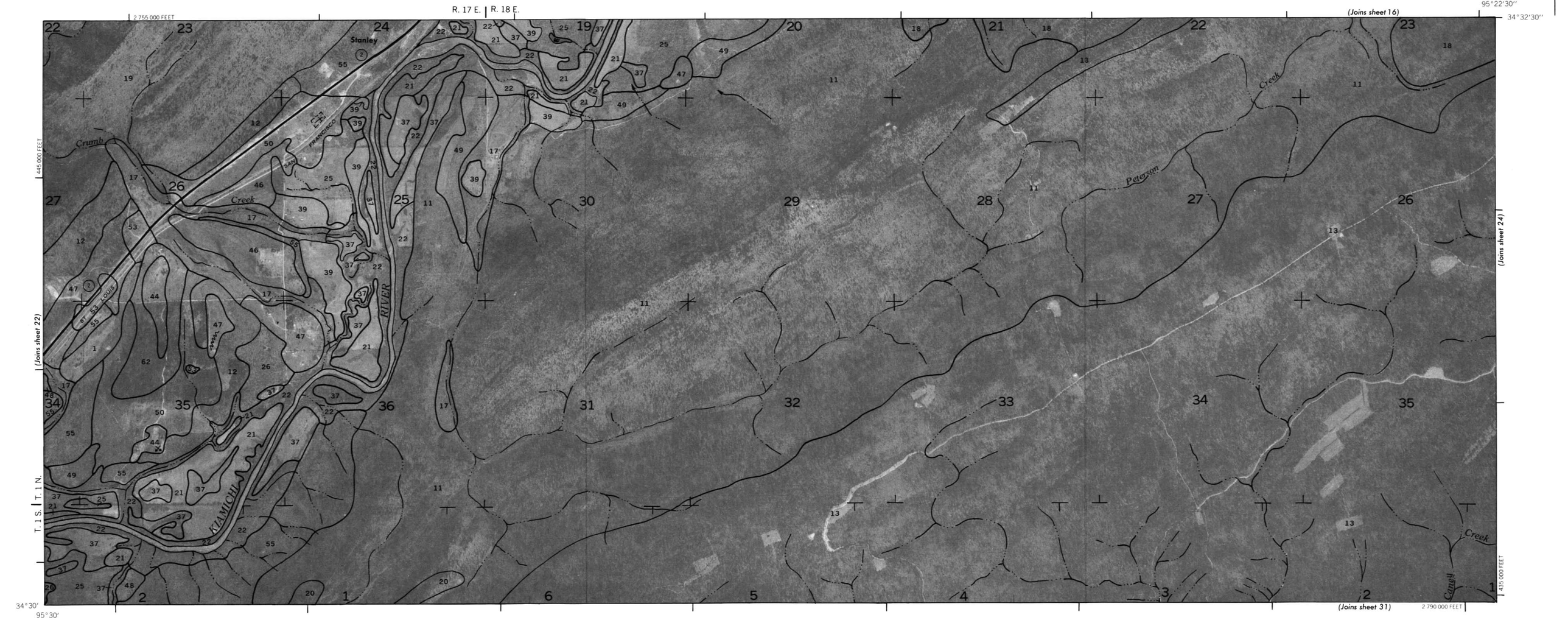


1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24000


22
N
95°37'30"
34°32'30"
(Joins sheet 15)
R. 16 E.
R. 17 E.
2 750 000 FEET
445 000 FEET
435 000 FEET
2 720 000 FEET
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 30)
T. 1 S.
T. 1 N.
34°30'
95°30'
Rock Town
Caney
Mountain
Little
Caney Creek
Peveuhouse Creek
Pine Creek
Wildcat Mountain
Wildcat Creek
Little Wildcat Creek
Marble Creek
Fobb Ridge
Fobb Creek
Pine Creek
Hackett Mountain
Hackett Creek
Johns Valley
Louis
KIAMICHI RIVER
SAN FRANCISCO
Scale 1:24000
5000 4000 3000 2000 1000 0 5000 10000 Feet
2 Miles



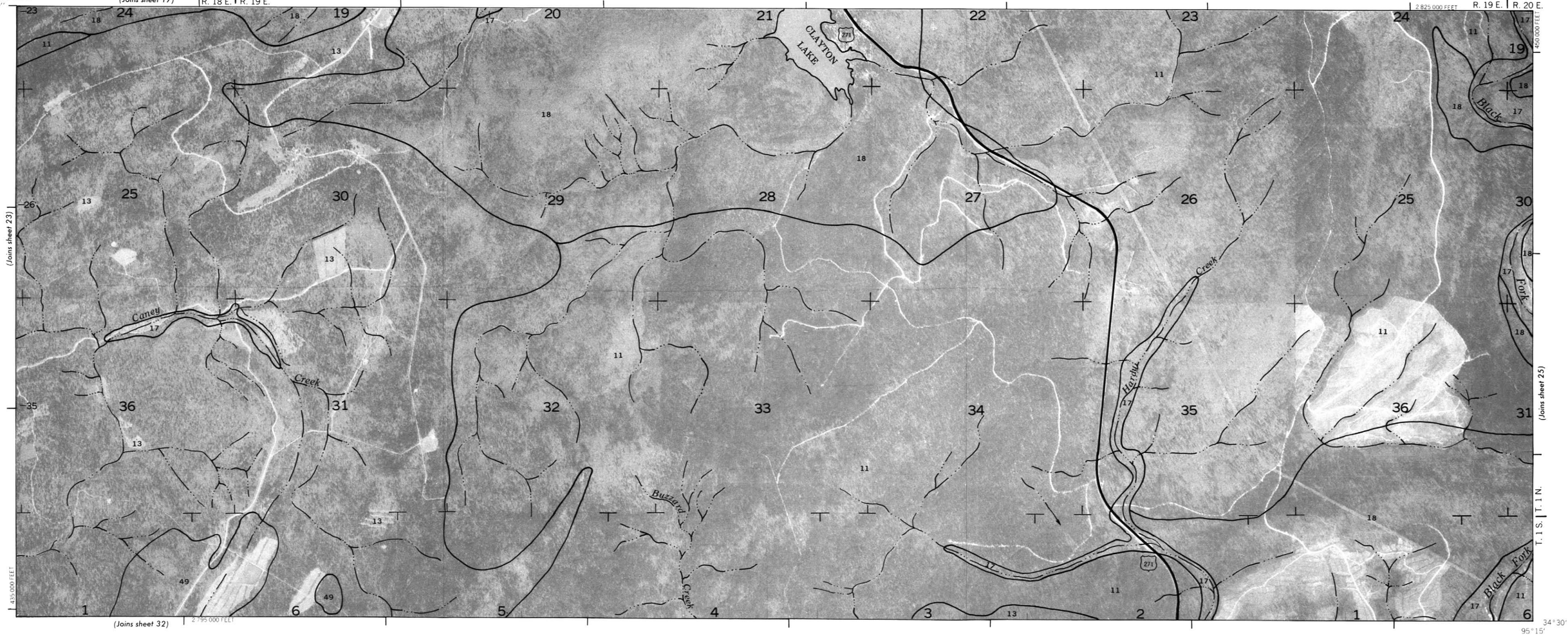
Scale 1:24000

1 ¾ ½ ¼ 0 1 2 Miles

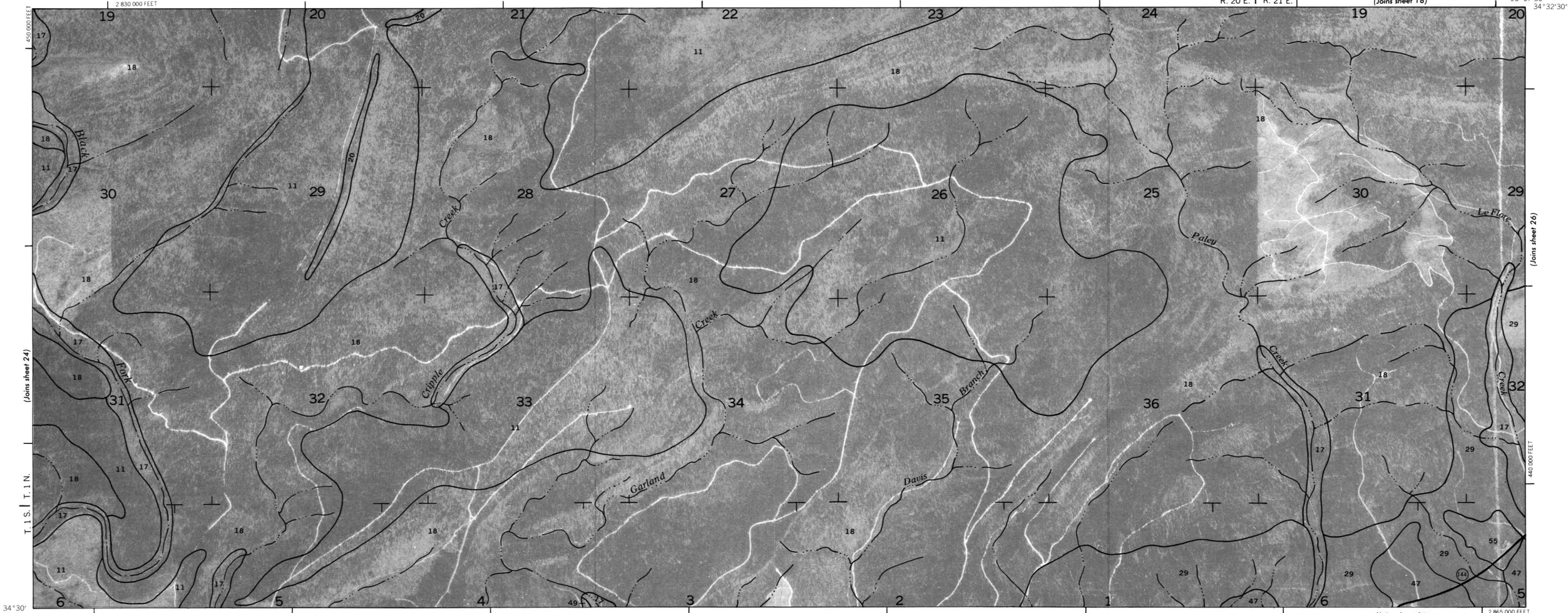
5000 4000 3000 2000 1000 0 5000 10000 Feet

PUSHMATAHA COUNTY, OKLAHOMA — SHEET NUMBER 24

N



N



Scale 1:24000

N

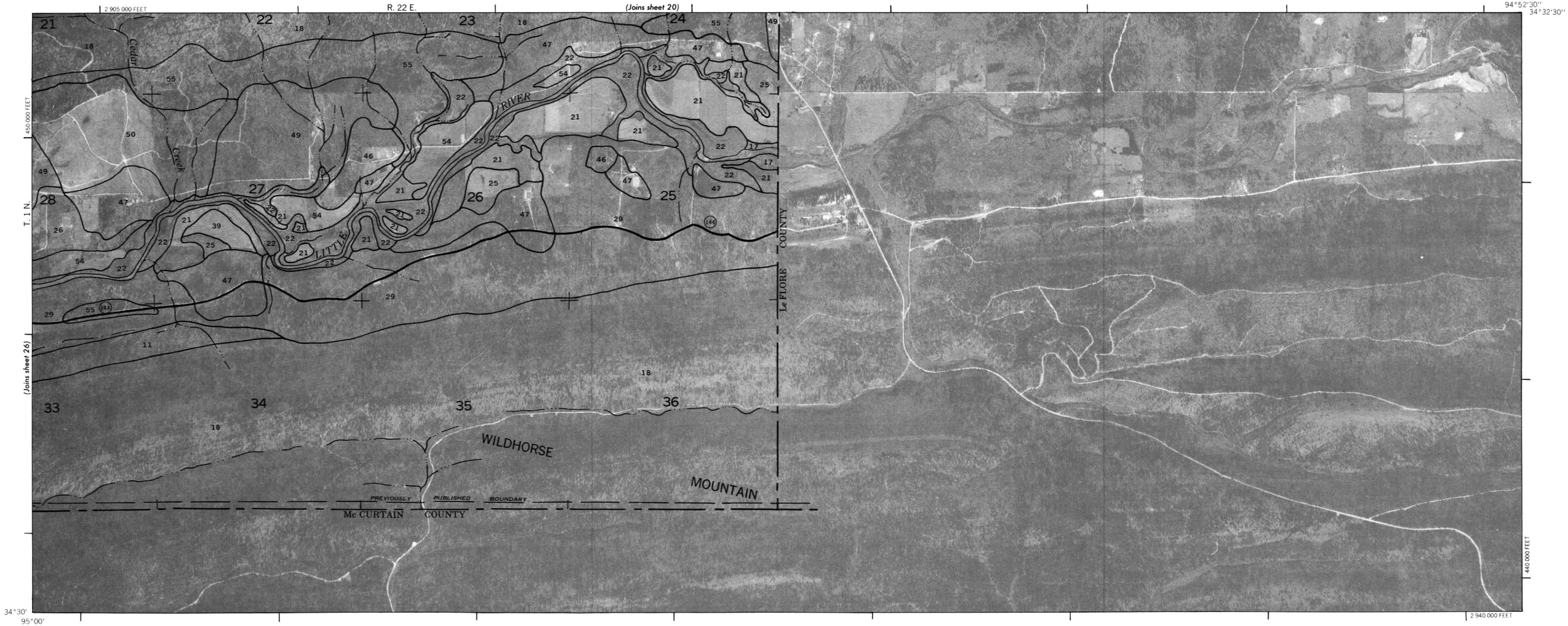
95°07'30"
34°32'30"

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000

N



1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000

N

INSET B

95°46'44" (Joins lower right) R. 15 E. 2 676 000 FEET

34°25'

400 000 FEET

ATOKA COUNTY

T. 2 S.

390 000 FEET

(Joins sheet 41)

2 671 000 FEET (Joins sheet 47)

34°22'30"

95°45'

Creek

VALLEY

IMPSON

Clear

INSET A

95°46'44" (Joins lower right) R. 15 E. 2 675 000 FEET

34°27'30"

415 000 FEET

ATOKA COUNTY

405 000 FEET

(Joins sheet 35)

T. 1 S.

T. 2 S.

2 670 000 FEET (Joins upper left)

34°25'

95°45'

Clear Creek

95°46'44" (Joins inset B, sheet 21) R. 15 E. 2 675 000 FEET

34°30'

430 000 FEET

ATOKA COUNTY

T. 1 S.

420 000 FEET

(Joins sheet 29)

2 670 000 FEET (Joins upper left)

34°27'30"

95°45'

Hollow

Happy

Creek

Tenmile

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000


N
R. 15 E.
R. 16 E.
T. 1 S.
2 680 000 FEET
2 715 000 FEET
430 000 FEET
420 000 FEET
95°37'30"
34°30'
34°27'30"
95°45'
(Joins sheet 21)
(Joins sheet 28)
(Joins sheet 30)
(Joins sheet 35)
Daisy Mountain
Little Tennile
Tennile Creek
Buck Creek
Mountain Creek
Caney Creek
Silver Creek
Spring Branch
Johns Valley
Marble Creek
Sibley Creek
INDIAN TRAIL ROAD
TURNPIKE
Scale 1:24000
2 Miles
10000 Feet

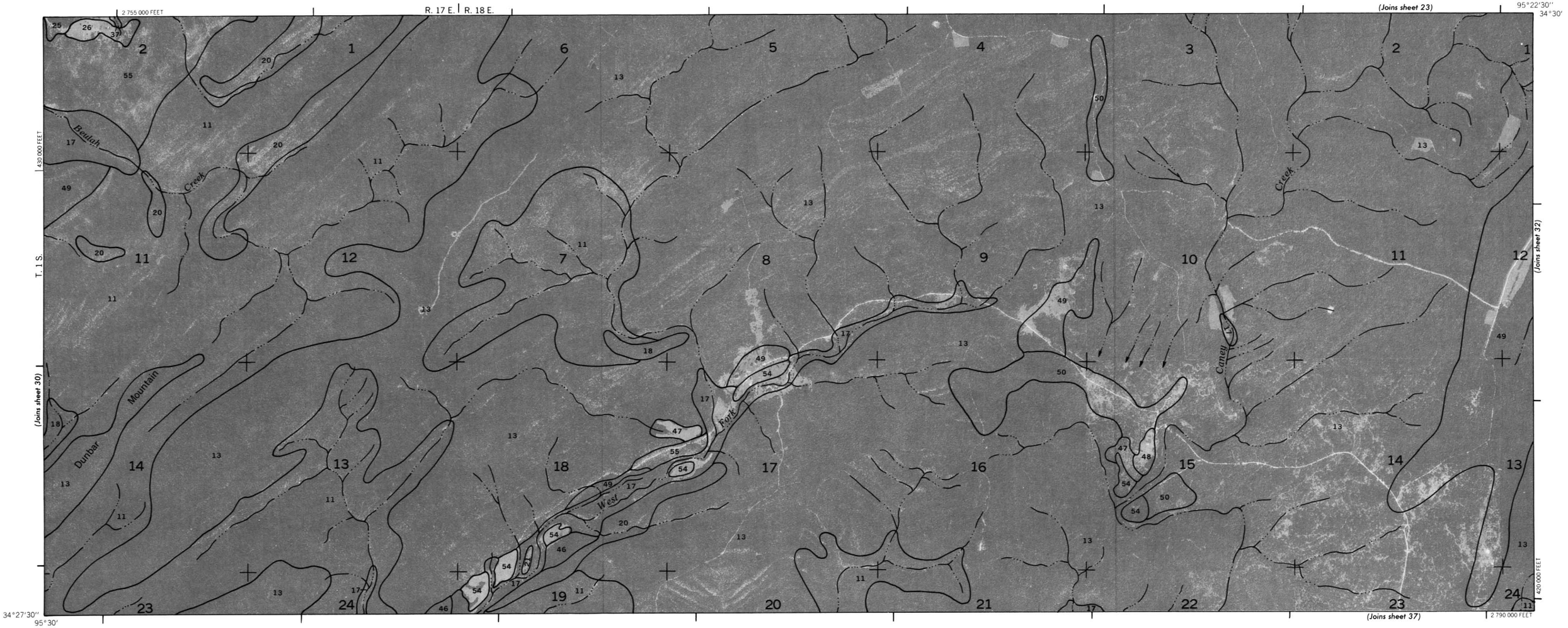
N

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24000

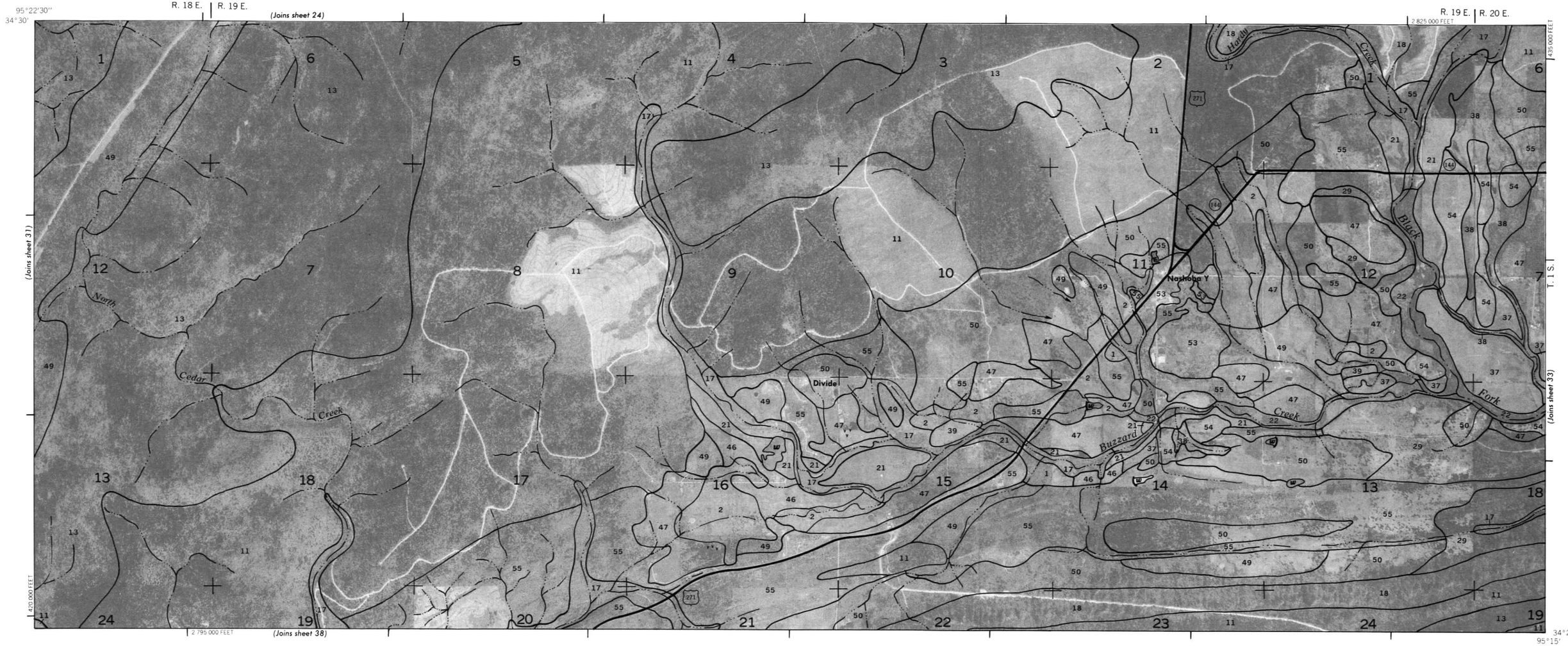
N



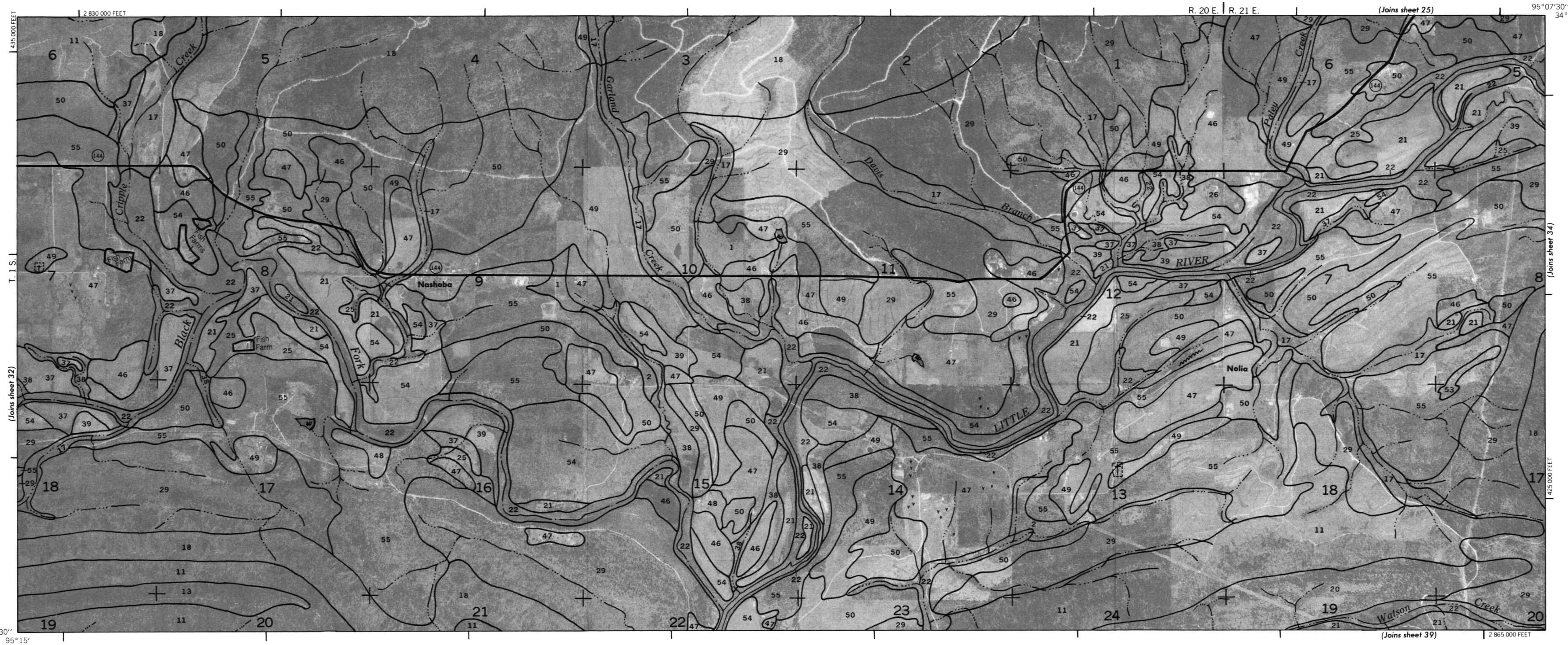
1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000


95°22'30"
34°30'
R. 18 E.
R. 19 E.
(Joins sheet 24)
R. 19 E.
R. 20 E.
2 825 000 FEET
435 000 FEET
(Joins sheet 31)
T. 1 S.
(Joins sheet 33)
420 000 FEET
2 795 000 FEET
(Joins sheet 38)
34°27'30"
95°15'
Cedar Creek
North
Divide
Buzzard Creek
Black Fork
Nashoba
271
144
Scale 1:24000
2 Miles
10000 Feet

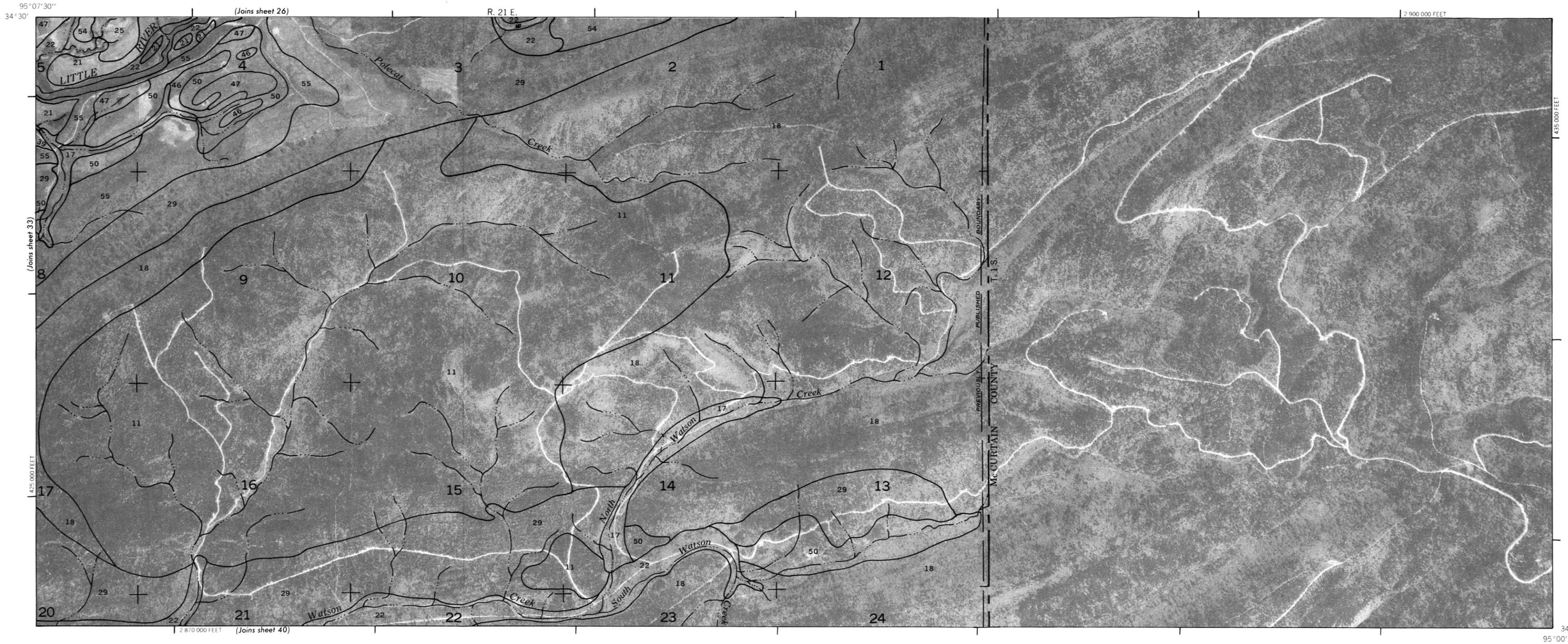
N



1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

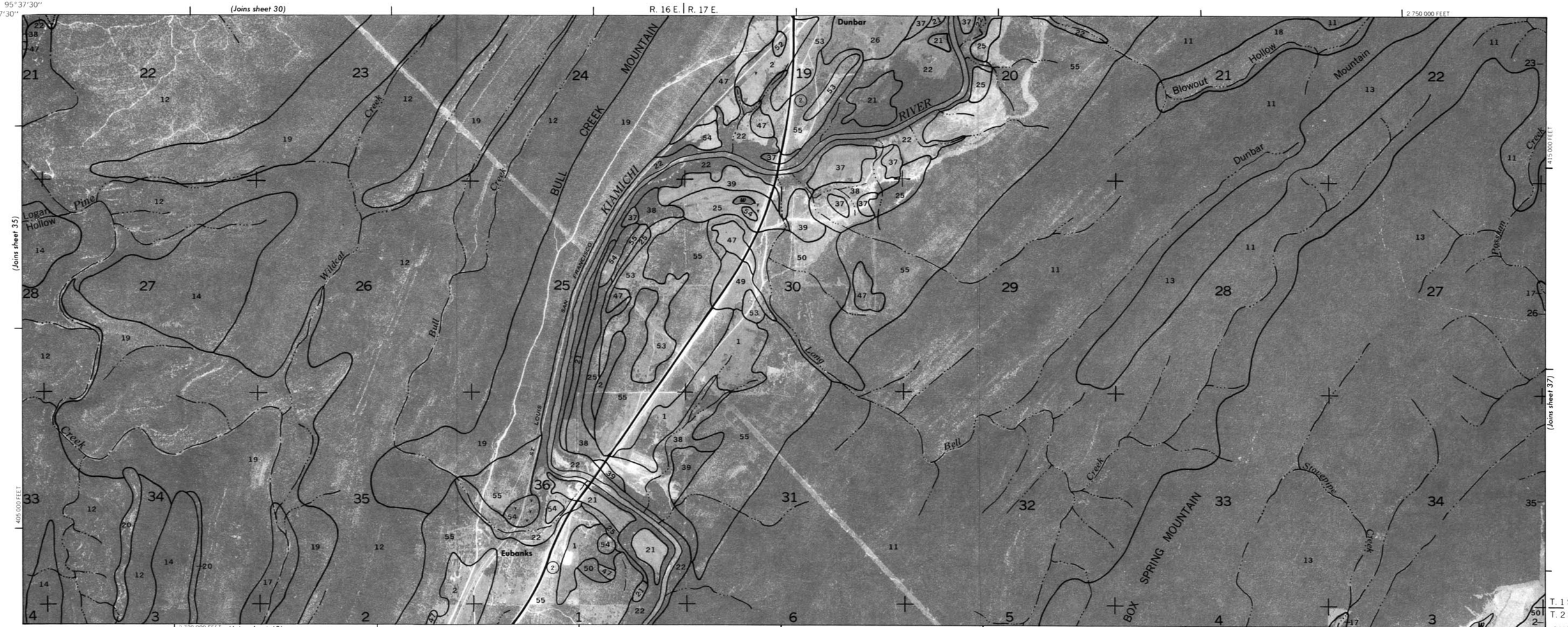
Scale 1:24000



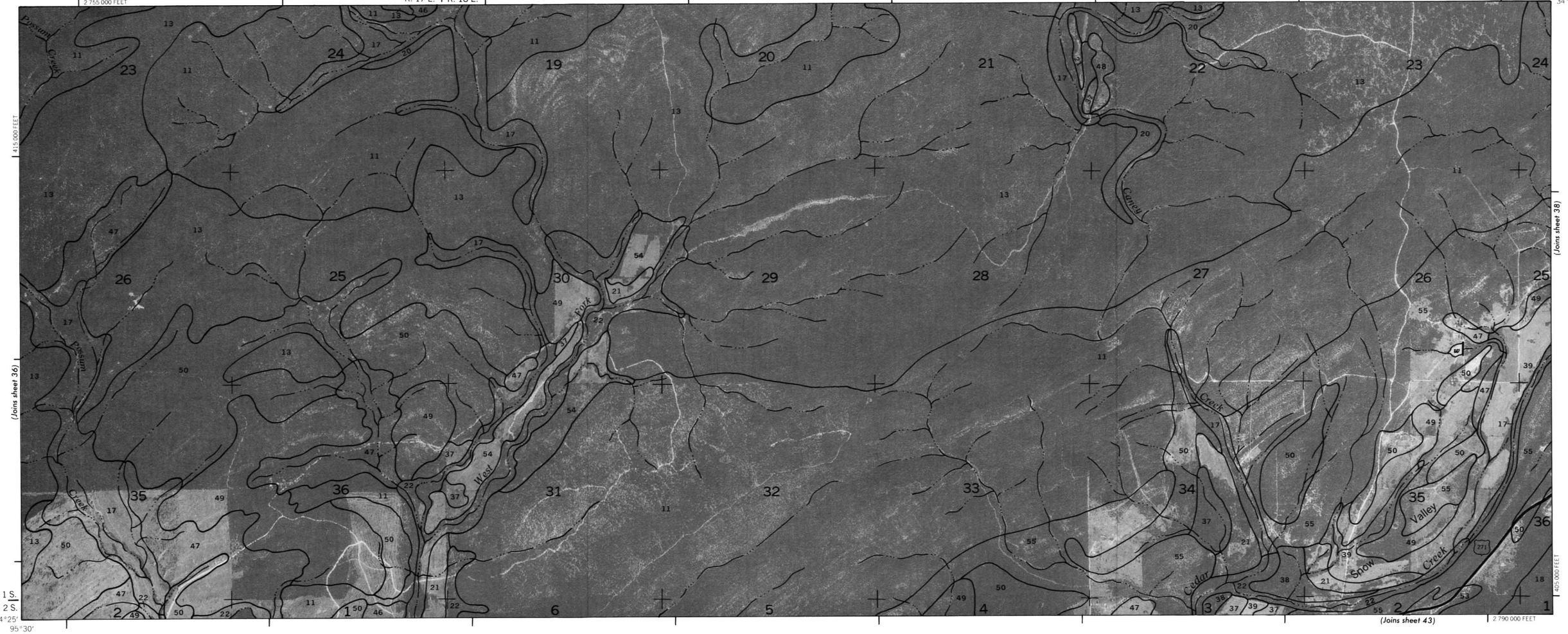
Scale 1:24000

N


2 680 000 FEET
R. 15 E.
R. 16 E.
(Joins sheet 29)
95°37'30"
34°27'30"
415 000 FEET
(Joins inset A, sheet 28)
(Joins sheet 36)
405 000 FEET
T. 1 S.
T. 2 S.
34°25'
95°45'
(Joins sheet 41)
2 715 000 FEET
IMPSON VALLEY
INDIAN NATION TURNPIKE
TOLL ROAD
Little Tenmile Creek
Tenmile Creek
Jumbo
Clear Creek
Buck Spring Branch
Box Springs Mountain
Creek
Pole Creek
Shorty Creek
Logan Hollow
Monkeywrench Creek
Scale 1:24000
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 ¾ ½ ¼ 0 1 2 Miles


95°37'30"
34°27'30"
(Joins sheet 30)
R. 16 E.
R. 17 E.
2 750 000 FEET
(Joins sheet 35)
(Joins sheet 37)
405 000 FEET
415 000 FEET
2 720 000 FEET
(Joins sheet 42)
T. 1 S.
T. 2 S.
34°25'
95°30'
Dunbar
Eubanks
Logan Hollow
Pine Creek
Wildcat Creek
Bull Creek
BULL CREEK MOUNTAIN
KIAMICHI RIVER
SAN FRANCISCO ST. LOUIS
Long Bell
Blowout Hollow
Dunbar Mountain
Possum Creek
Stougenine Creek
BOX SPRING MOUNTAIN
Scale 1:24000
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 3/4 1/2 1/4 0 1 2 Miles

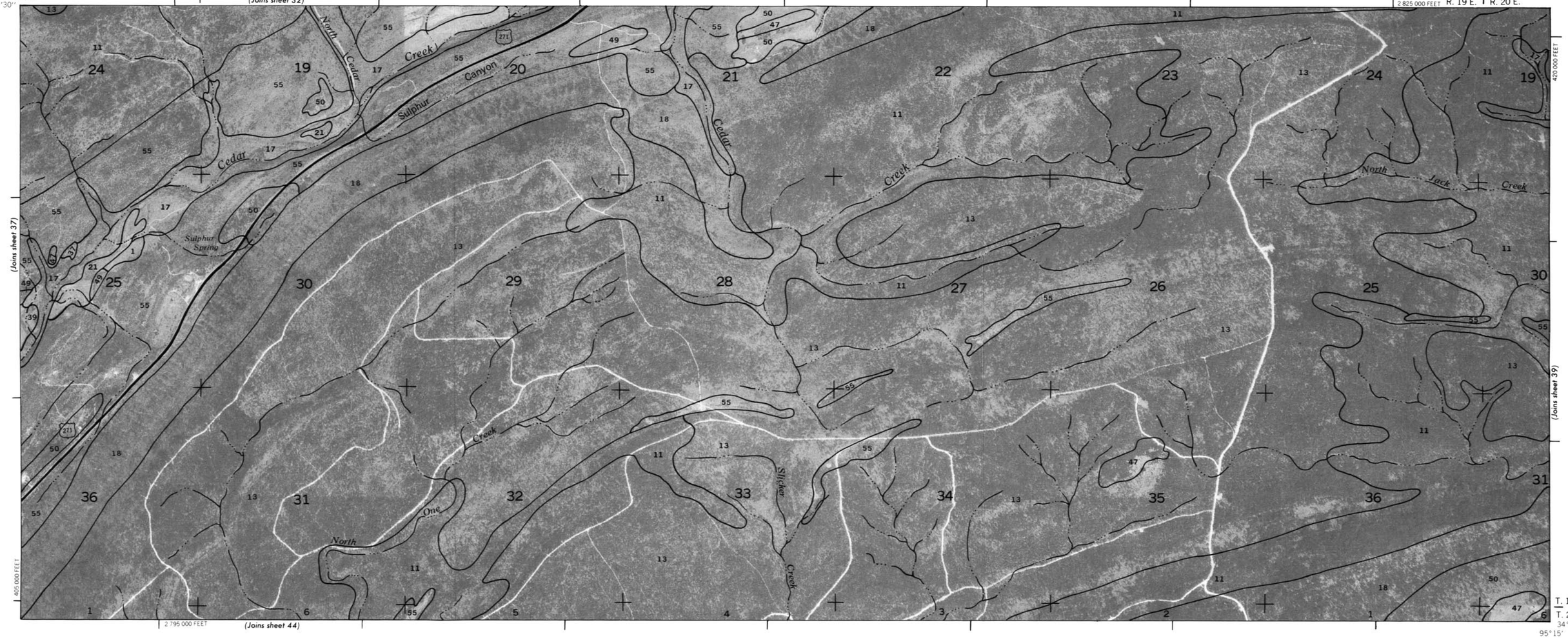
N



1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24000

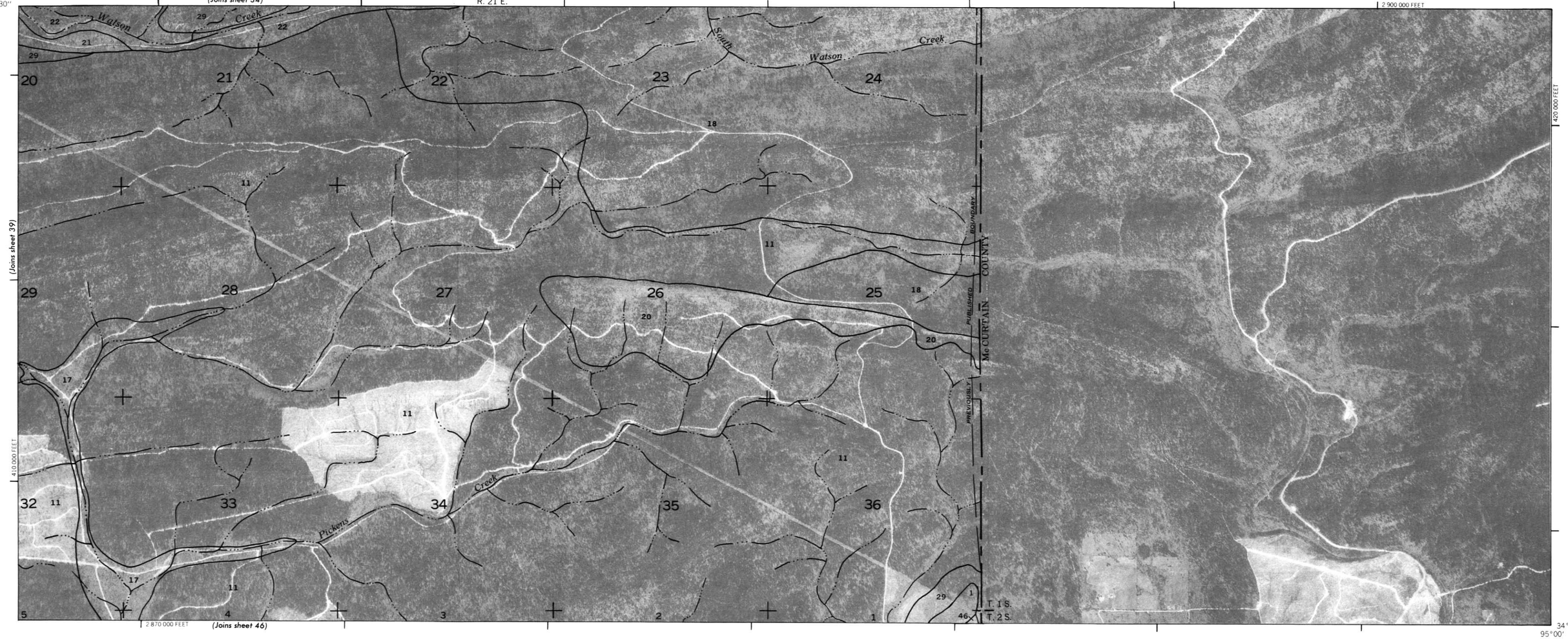

95°22'30"
34°27'30"
R. 18 E.
R. 19 E.
(Joins sheet 32)
2 825 000 FEET
R. 19 E.
R. 20 E.
420 000 FEET
(Joins sheet 37)
(Joins sheet 39)
405 000 FEET
2 795 000 FEET
(Joins sheet 44)
North Cedar Creek
Sulphur Canyon
Cedar Creek
Sulphur Spring
North Jack Creek
Creek
Slipkear Creek
North One Creek
271
T. 1 S.
T. 2 S.
34°25'
95°15'
Scale 1:24000
2 Miles
10000 Feet

N


2 830 000 FEET
R. 20 E.
R. 21 E.
(Joins sheet 33)
95°07'30"
34°27'30"
420 000 FEET
(Joins sheet 38)
North Jack Creek
Jack Creek
Watson Creek
RIVER
LITTLE
Mountain
Musket
L. Pickens
(Joins sheet 40)
410 000 FEET
(Joins sheet 45)
2 865 000 FEET
T. 1 S.
T. 2 S.
34°25'
95°15'
1 3/4 1/2 1/4 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

N

PUSHMATAHA COUNTY, OKLAHOMA — SHEET NUMBER 40



1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000

N


2 680 000 FEET
R. 15 E.
R. 16 E.
(Joins sheet 35)
95°37'30"
34°25'
400 000 FEET
T. 2 S.
(Joins inset B, sheet 28)
(Joins sheet 42)
390 000 FEET
34°22'30"
95°45'
(Joins sheet 48)
2 715 000 FEET
VALLEY
IMPSON
MOUNTAIN
ROCK
WHITE
BIG
Little Mountain
Creek
Pole
Horsehead
Mountain
Shorty
Buck
Top
Flat
Little
Kimbrough
Tennile
Wildhorse
Whiskey
INDIAN NATION TURNPIKE
TOLL ROAD
Water
1 ¾ ½ ¼ 0 1 2 Miles
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
Scale 1:24000

N

95°37'30"
34°25'

(Joins sheet 36)

R. 16 E. | R. 17 E.

2 750 000 FEET

400 000 FEET

T. 2 S.

(Joins sheet 41)

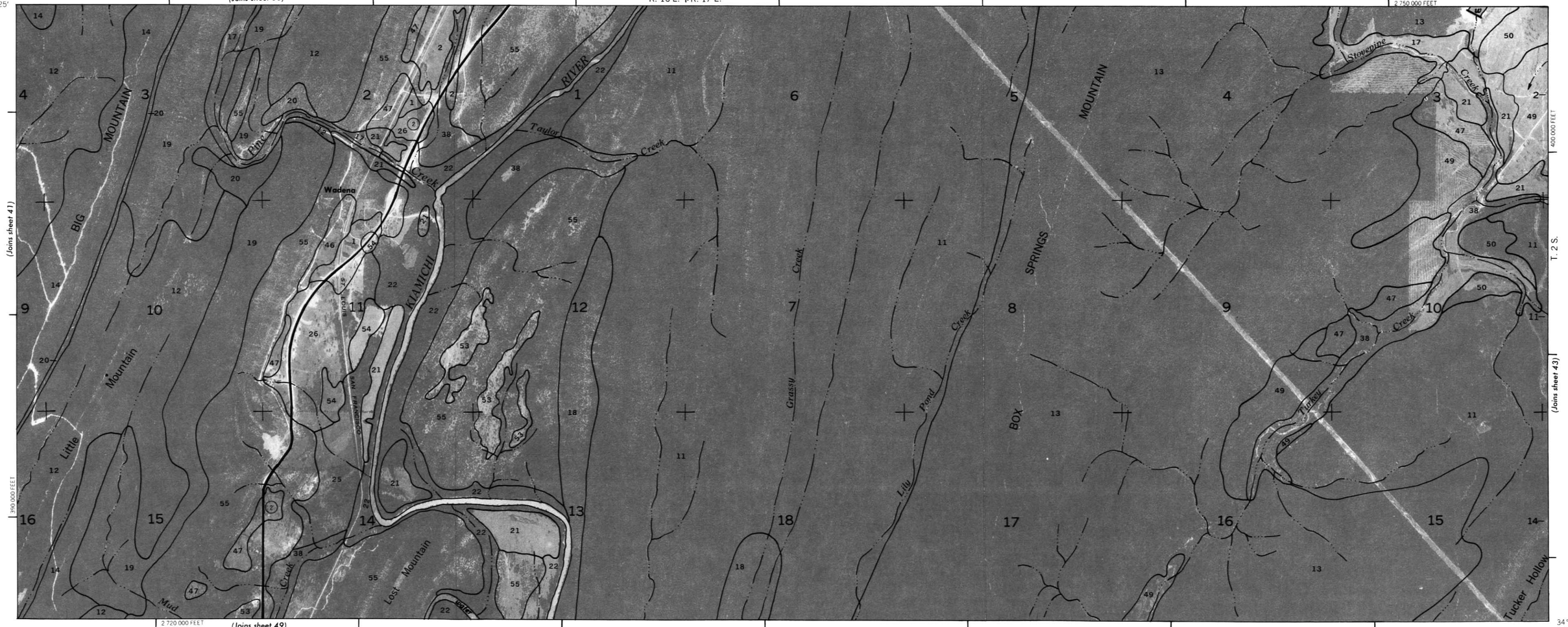
(Joins sheet 43)

190 000 FEET

2 720 000 FEET

(Joins sheet 49)

34°22'30"
95°30'



Scale 1:24000

1 0 1 2 Miles

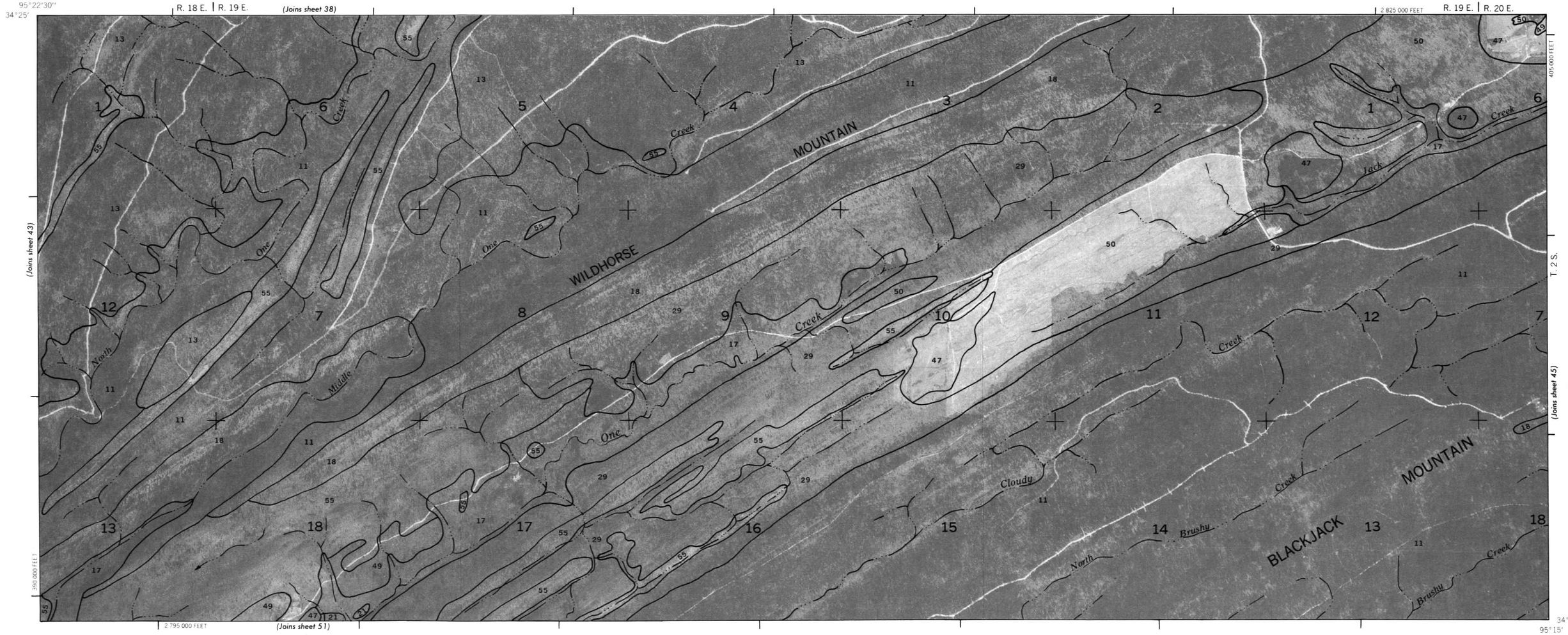
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

N

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000

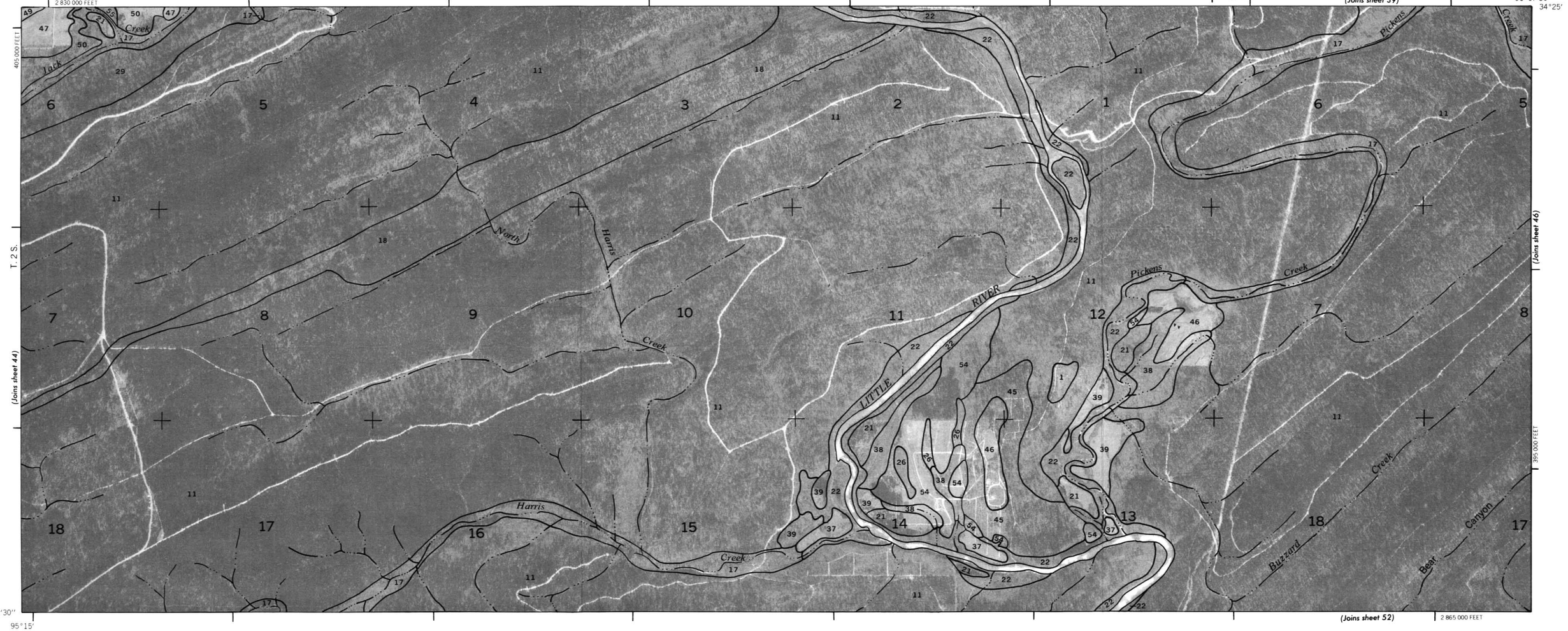


Scale 1:24000

1 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

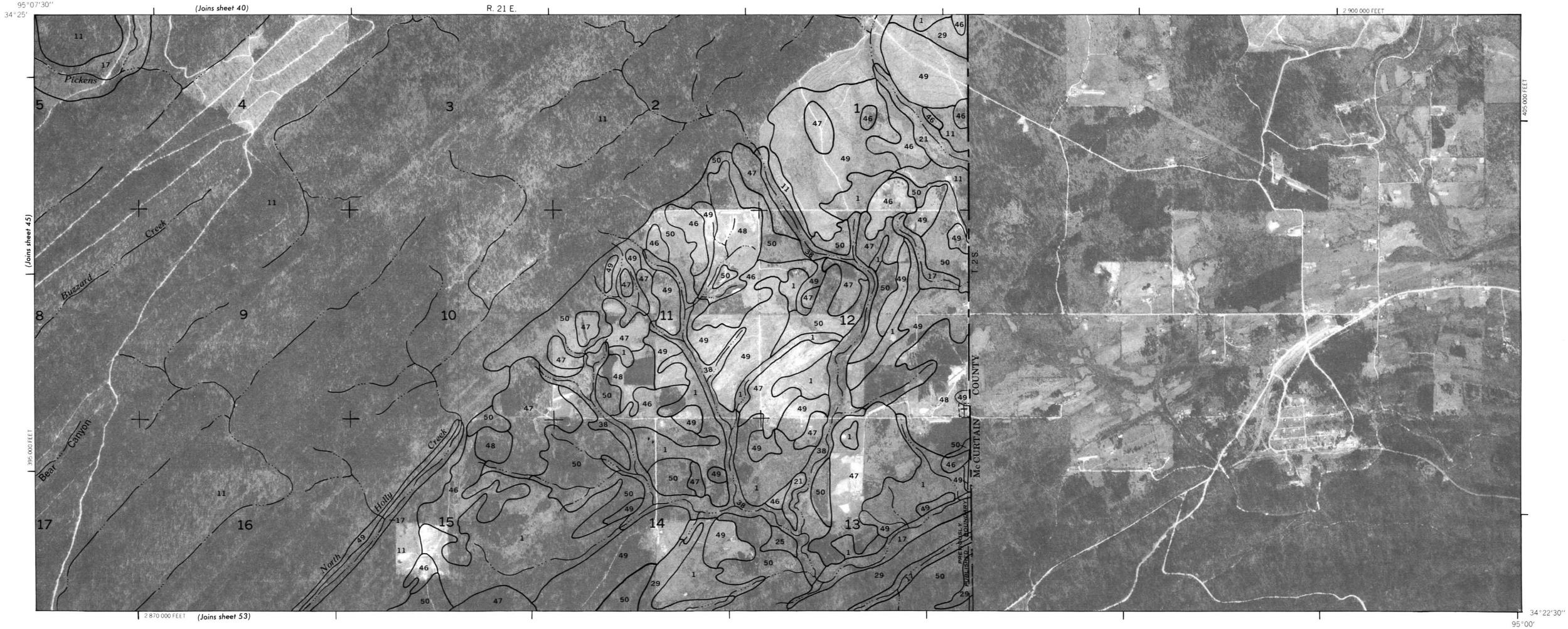
N



1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24000



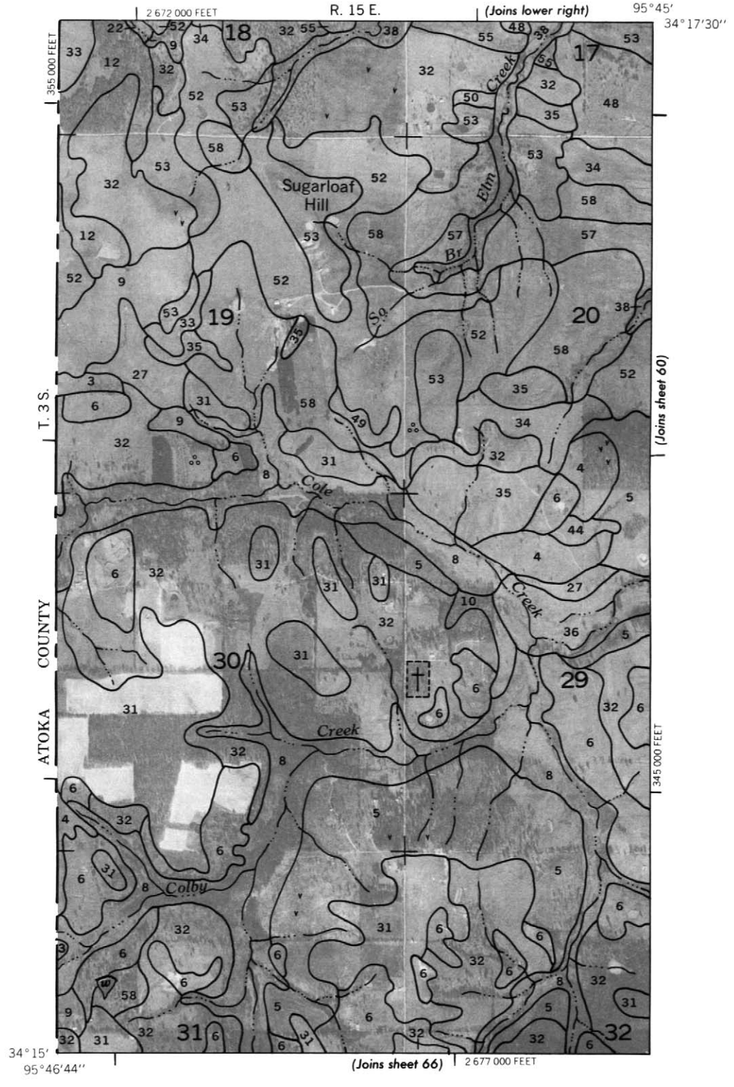
1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

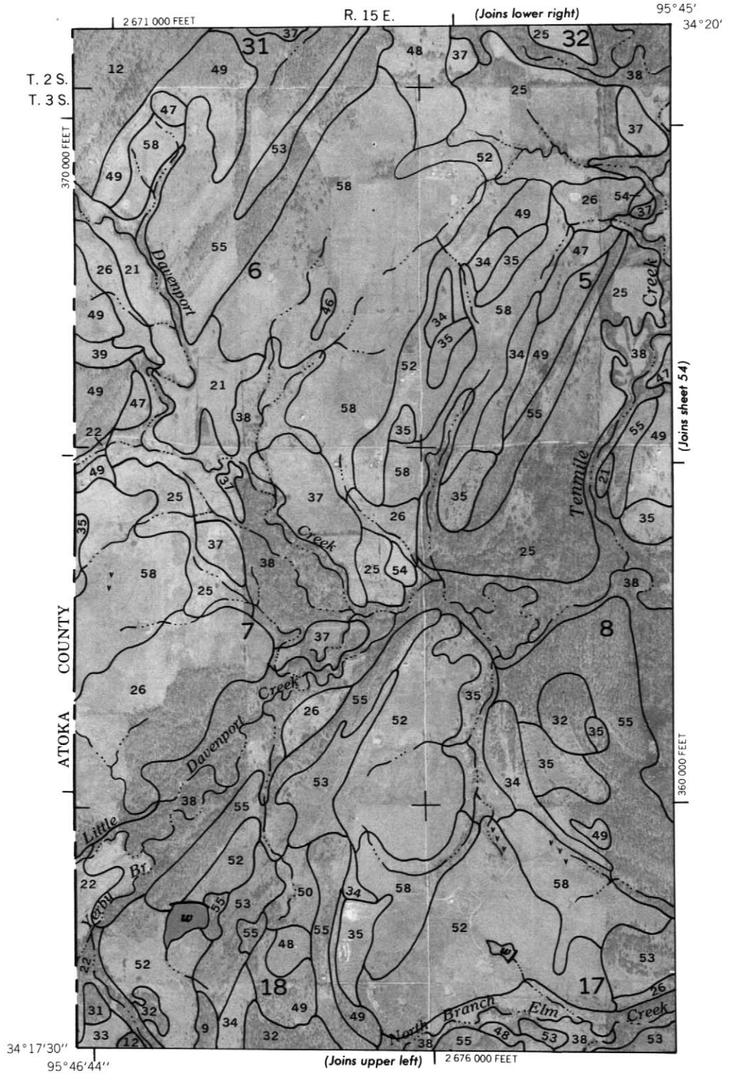
Scale 1:24 000

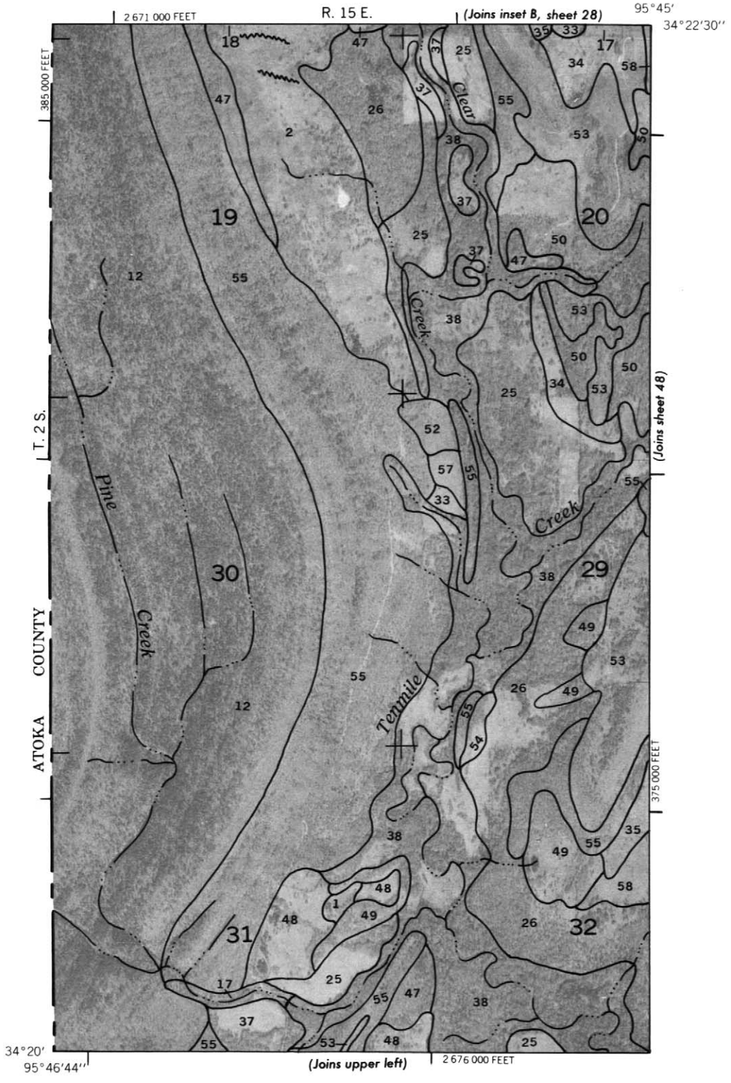
N

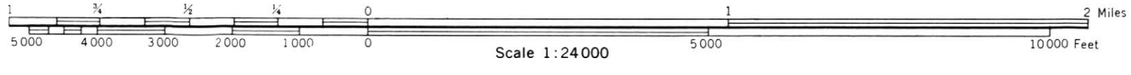
INSET B



INSET A

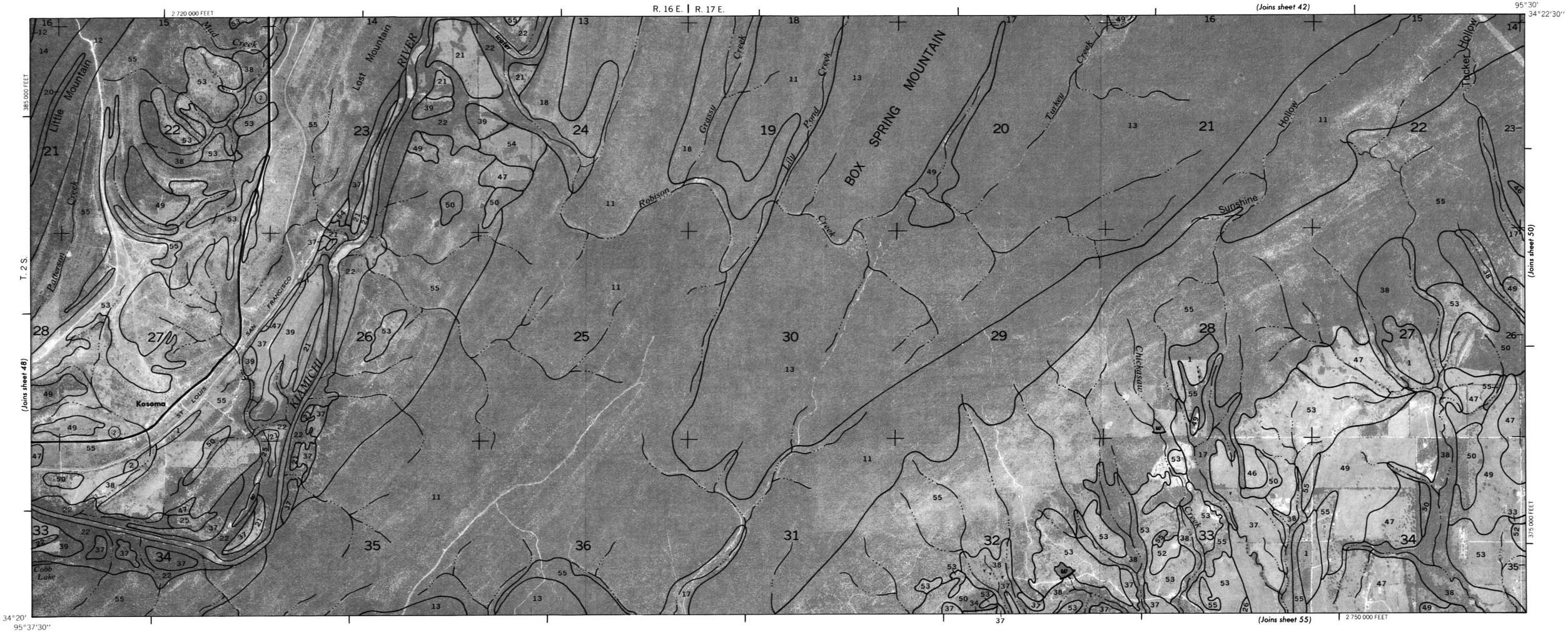







N
95°45'
34°22'30"
(Joins sheet 41)
R. 15 E.
R. 16 E.
2 715 000 FEET
385 000 FEET
T. 2 S.
(Joins sheet 47)
(Joins sheet 49)
375 000 FEET
2 680 000 FEET
(Joins sheet 54)
34°20'
95°37'30"
Tenmile Creek
VALLEY
IMPSON
Creek
Hampton
Creek
INDIAN NATION TURNPIKE (TOLL ROAD)
water
Wildhorse Creek
Little Creek
Wildhorse Creek
WHITE ROCK MOUNTAIN
Horsehead Creek
Buck Creek
Kimbrough Creek
BIG MOUNTAIN
Creek
Mountain
Little Creek
Whiskey Creek
Buck Creek
Patterson Creek
SAN FRANCISCO RIVER
KIAMICHI
Cobb Lake
ST LOUIS
Razorback Mountain
Branch
Clay
Parker Mountain
1 0 1 2 Miles
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
Scale 1:24000

N



1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000

N

95°30'
34°22'30"

(Joins sheet 43)

R. 17 E. | R. 18 E.

2 790 000 FEET

385 000 FEET

T. 2 S.

(Joins sheet 49)

(Joins sheet 51)

375 000 FEET

2 755 000 FEET

(Joins sheet 56)

34°20'
95°22'30"

Mountain

Roundtop

Creek

Cedar

Dod

North

One

Scale 1:24000

2 Miles

10 000 Feet

N

Scale 1:24000

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

N

95°15'
34°22'30"

(Joins sheet 45)

R. 20 E. | R. 21 E.

2 865 000 FEET

390 000 FEET

T. 2 S.

(Joins sheet 51)

380 000 FEET

(Joins sheet 53)

(Joins sheet 58)

2 835 000 FEET

34°20'
95°07'30"

LITTLE RIVER

Bear Canyon

Harris Creek

North Holly Creek

Holly Creek

John Noah Mountain

Iron Springs

Devils Backbone

Scale 1:24000

1 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

N

2 870 000 FEET

R. 21 E.

(Joins sheet 46)

95°00'

34°22'30"

390 000 FEET

T. 2 S.

(Joins sheet 52)

Creek

Holly

North

Holly

Creek

Mountain

Noah

John

Creek

Holly

South

Creek

Terrapin

Creek

West

Big Horseshoe Mountain

Little Horseshoe Mountain

Mc CURTAIN COUNTY

PUBLISHED BOUNDARY

PREVIOUSLY

380 000 FEET

34°20'

95°07'30"

(Joins sheet 59)

2 905 000 FEET

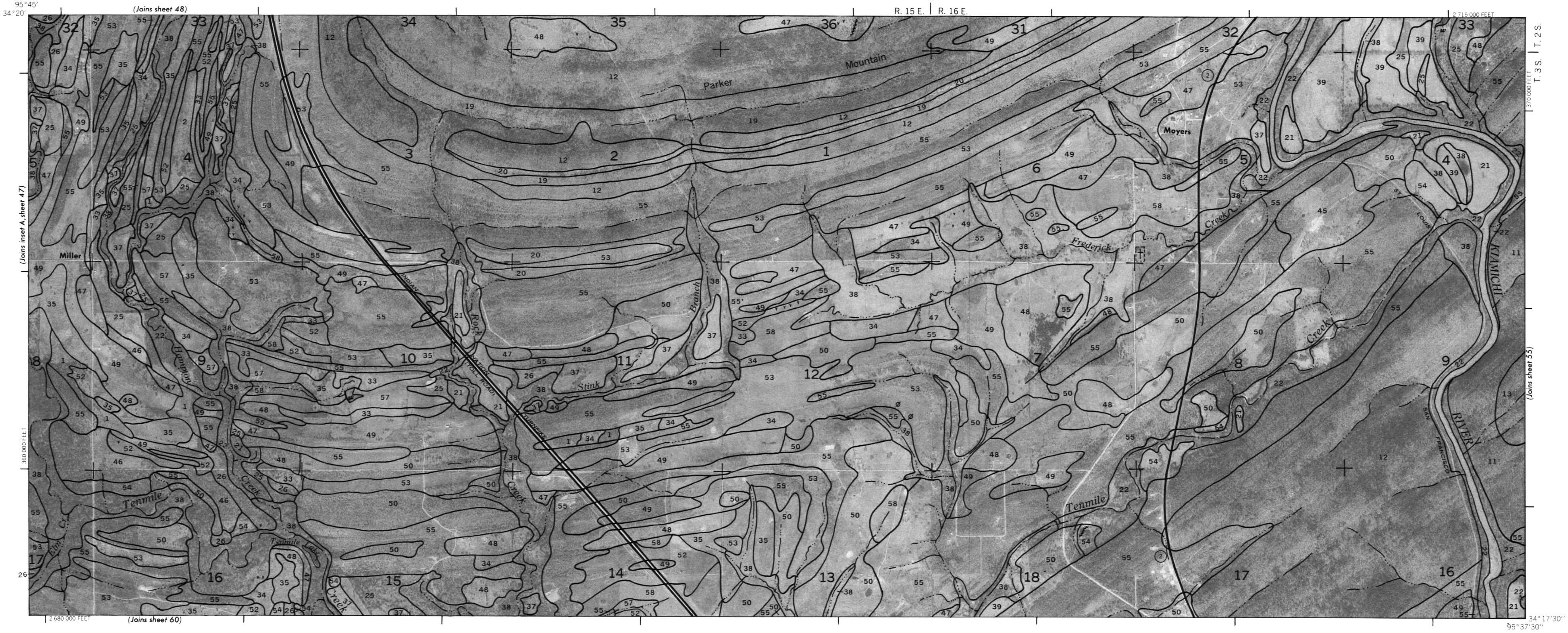
Scale 1:24000

1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

PUSHMATAHA COUNTY, OKLAHOMA — SHEET NUMBER 54

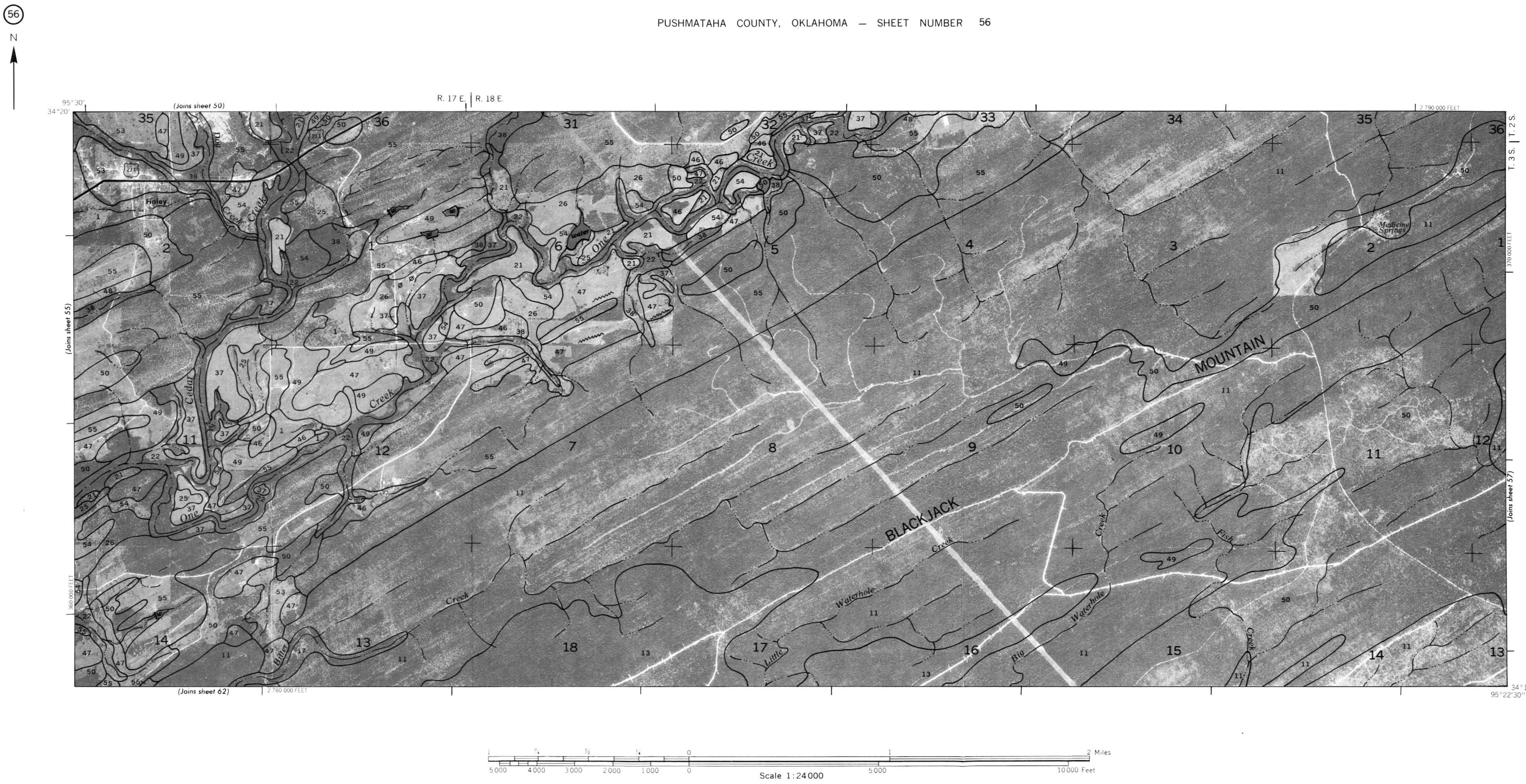
N



2 Miles
10 000 Feet
Scale 1:24 000


N
2 720 000 FEET
R. 16 E.
R. 17 E.
(Joins sheet 49)
95°30'
34°20'
T. 3 S.
T. 2 S.
370 000 FEET
(Joins sheet 54)
(Joins sheet 56)
360 000 FEET
34°17'30"
95°37'30"
(Joins sheet 61)
2 755 000 FEET
Caroline Creek
Little Cedar Creek
Cedar Creek
Chickasaw Creek
Cedar Creek
271
1 ¾ ½ ¼ 0 1 2 Miles
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
Scale 1:24000

PUSHMATAHA COUNTY, OKLAHOMA — SHEET NUMBER 56



N

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000

N

95°15'
34°20'

(Joins sheet 52)

R. 20 E. | R. 21 E.

2 865 000 FEET

T. 3 S. | T. 2 S.

375 000 FEET

(Joins sheet 57)

365 000 FEET

(Joins sheet 59)

(Joins sheet 64)

2 835 000 FEET

34°17'30"
95°07'30"

Cloudy Creek

LITTLE RIVER

Holly Creek

South Holly Creek

Rock Pen Creek

CANEY MOUNTAIN

Scale 1:24000

1 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

N

2 870 000 FEET

R. 21 E.

(Joins sheet 53)

95°00'

34°20'

T. 3 S.

T. 2 S.

375 000 FEET

(Joins sheet 58)

Mountain

Signal

West

Terrapin

Creek

Little Horseshoe Mountain

Big Horseshoe Mountain

Can Creek

Whiskey Branch

PUBLISHED BOUNDARY

PREVIOUSLY

McCURTAIN COUNTY

365 000 FEET

34°17'30"

95°07'30"

(Joins sheet 65)

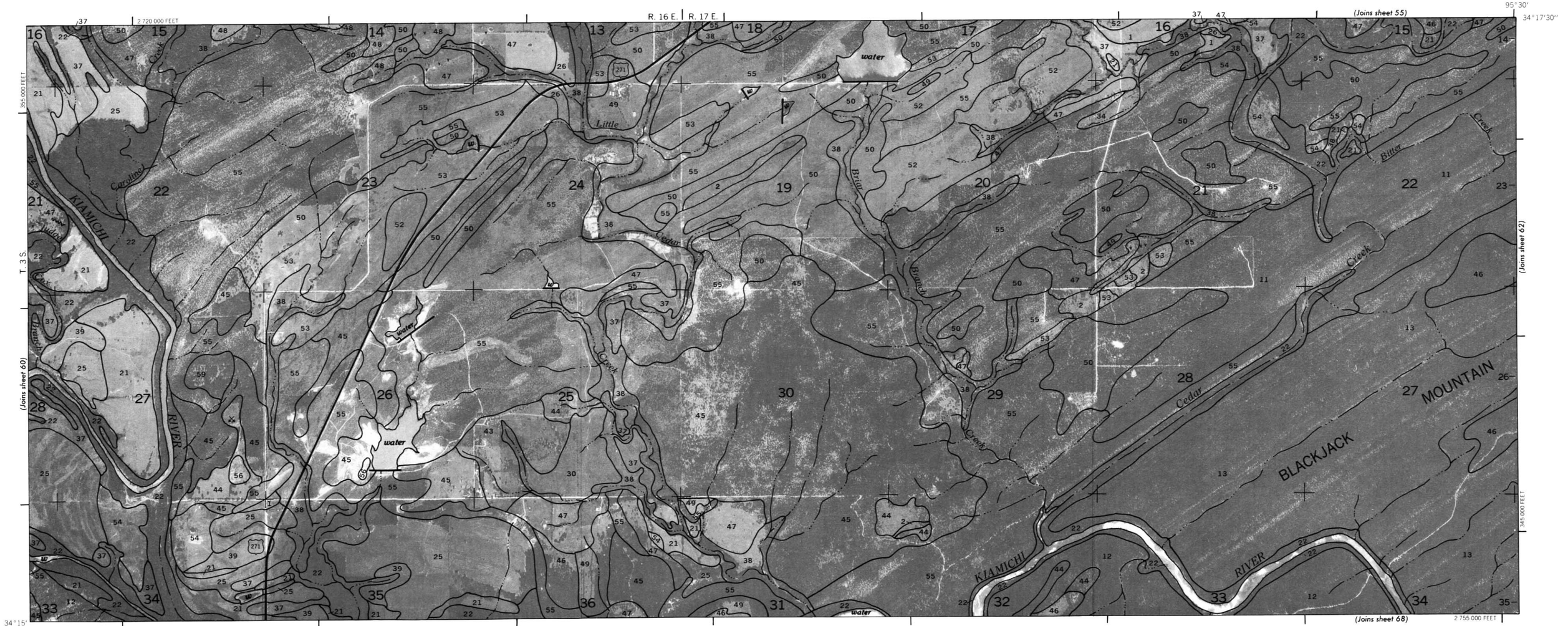
2 905 000 FEET

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000


95°45'
34°17'30"
(Joins sheet 54)
R. 15 E.
R. 16 E.
2 715 000 FEET
355 000 FEET
345 000 FEET
2 680 000 FEET
(Joins inset B, sheet 47)
(Joins sheet 67)
(Joins sheet 61)
34°15'
95°37'30"
T. 3 S.
KIAMICHI R.
MOUNTAIN
RODNEY
INDIAN
TOLL ROAD
NATION
TEXARKANA
Tennile Creek
Horsehead Creek
Racetrack Prairie
Caley Creek
Panther Creek
Cox Branch
Judge Creek
Kellond
ST. LOUIS & SAN FRANCISCO
KIAMICHI RIVER
1 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000



1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000

N

95°30'
34°17'30"

(Joins sheet 56)

R. 17 E. | R. 18 E.

2 790 000 FEET

355 000 FEET

T. 3 S.

(Joins sheet 61)

345 000 FEET

(Joins sheet 63)

(Joins sheet 69)

2 760 000 FEET

34°15'
95°22'30"

MOUNTAIN

BLACKJACK

Bitter Creek

Waterhole Creek

Little Waterhole Creek

Fish Creek

Duck Creek

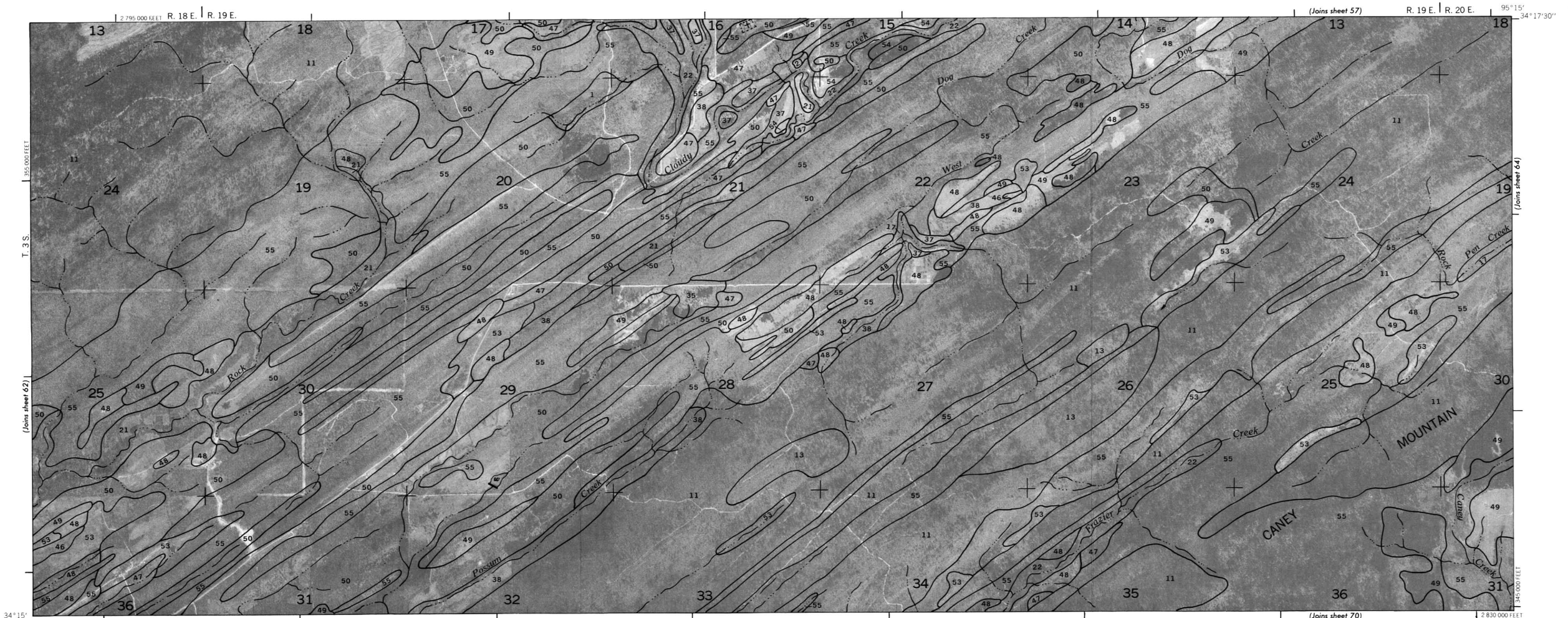
Nelson Creek

Rock Branch

Scale 1:24000

2 Miles

10 000 Feet



Scale 1:24000

1 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

63

N

N

95°15'
34°17'30"

(Joins sheet 58)

R. 20 E. | R. 21 E.

2 865 000 FEET

360 000 FEET

T. 3 S.

(Joins sheet 63)

(Joins sheet 65)

345 000 FEET

(Joins sheet 71)

2 835 000 FEET

34°15'
95°07'30"

MOUNTAIN

CANEY

Pen Rock Creek

Caney Creek

Can Creek

Wolf Mountain

Houston Creek

Rain Creek

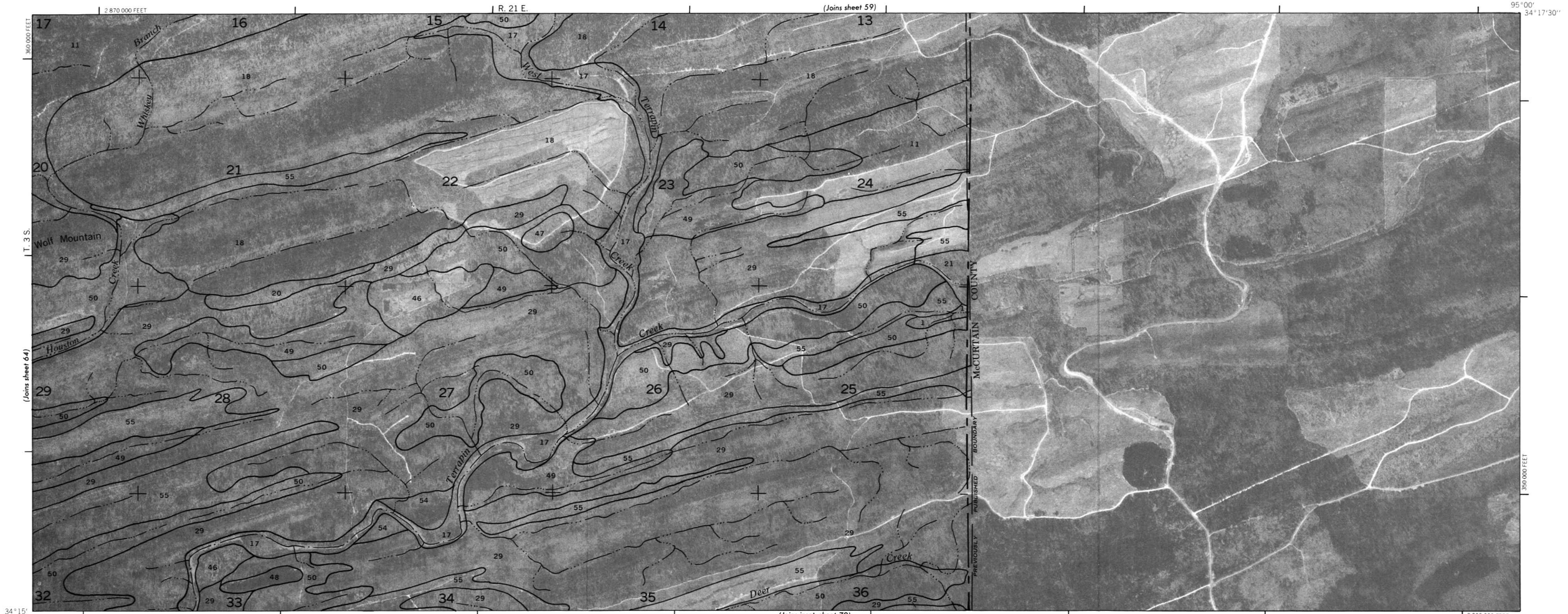
LITTLE RIVER

Scale 1:24000

1 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

N

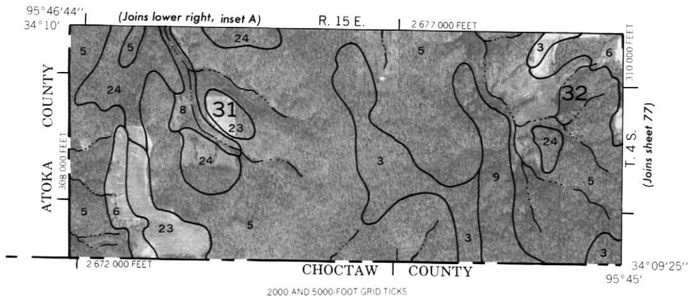


1 ¾ ½ ¼ 0 1 2 Miles

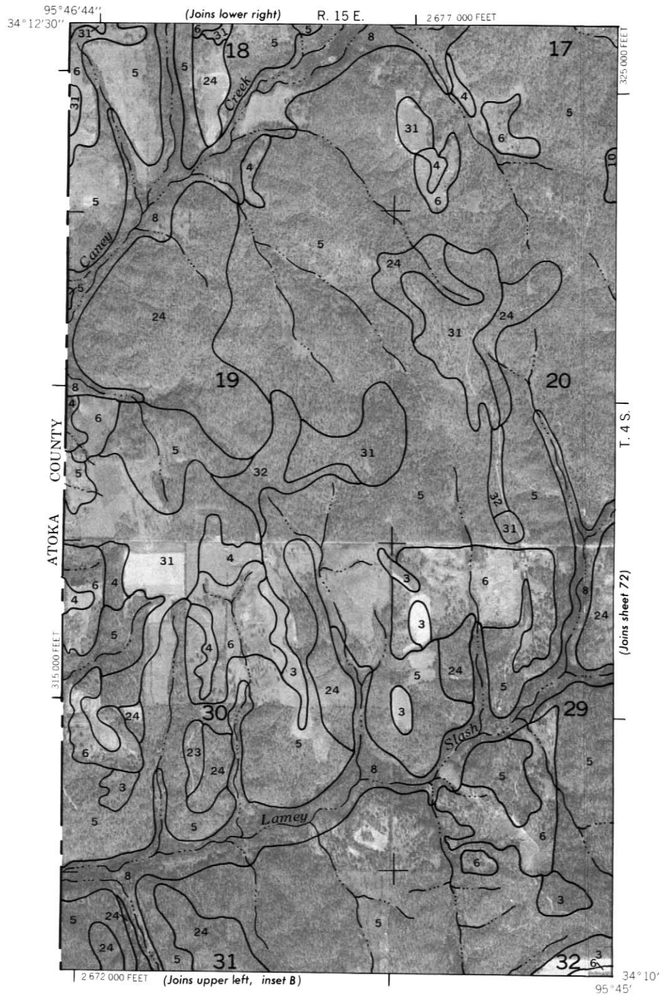
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

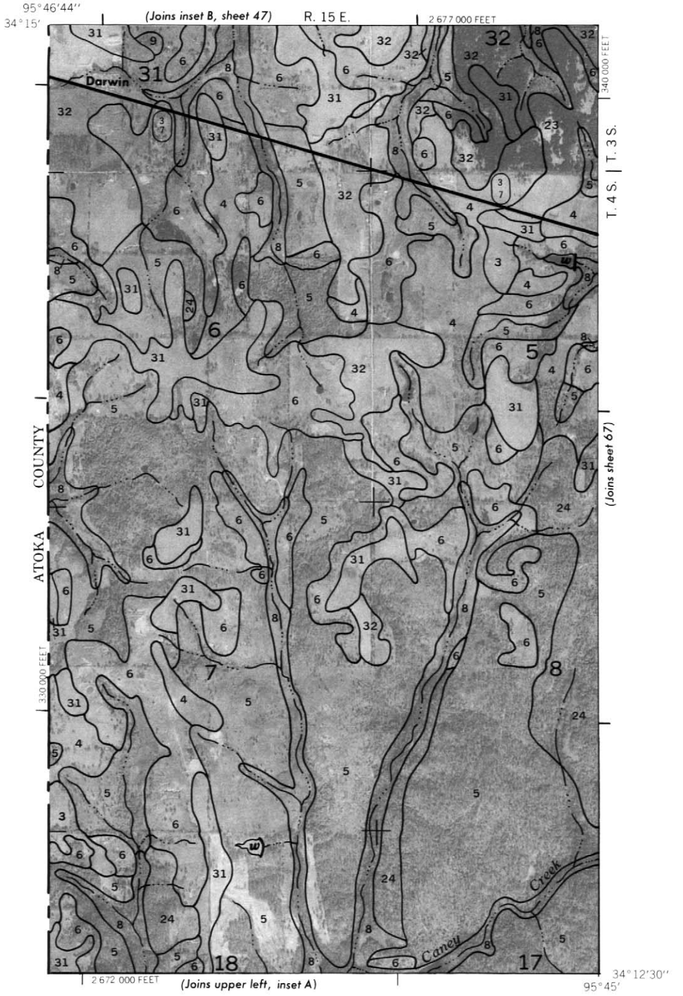
Scale 1:24 000

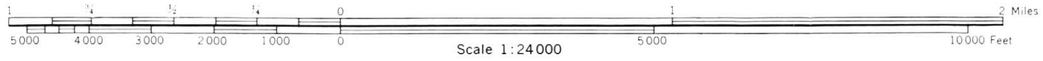
INSET B

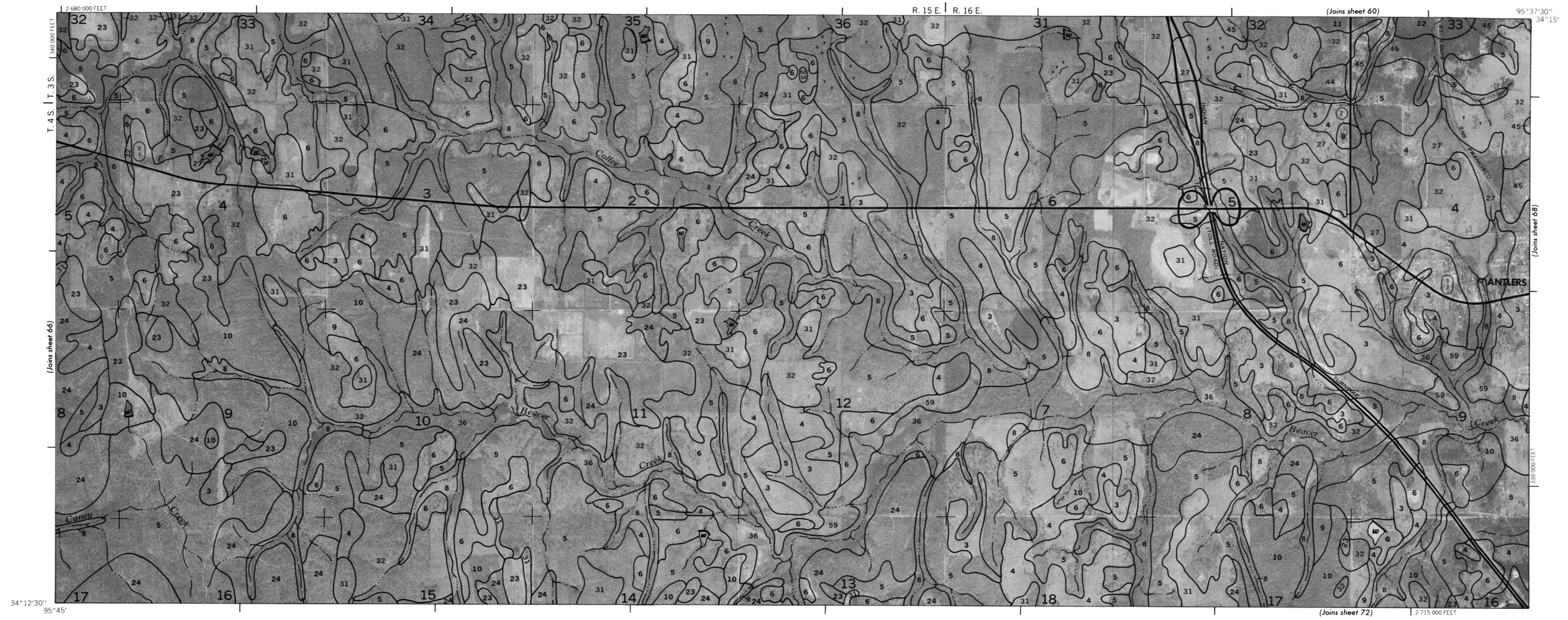


INSET A








N
2 680 000 FEET
R. 15 E.
R. 16 E.
95°37'30"
34°15'
T. 4 S.
T. 3 S.
340 000 FEET
(Joins sheet 60)
(Joins sheet 66)
(Joins sheet 68)
(Joins sheet 72)
330 000 FEET
34°12'30"
95°45'
2 715 000 FEET
Coffee Creek
Beaver Creek
Caney Creek
ANTLERS
INDIAN TROLLEY ROAD
SAN FRANCISCO
TURNPIKE
1 3/4 0 1 2 Miles
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
Scale 1:24 000

N


95°37'30"
34°15'
R. 16 E.
R. 17 E.
2 755 000 FEET
T. 4 S.
T. 3 S.
340 000 FEET
330 000 FEET
2 720 000 FEET
95°30'
34°12'30"
(Joins sheet 61)
(Joins sheet 67)
(Joins sheet 69)
(Joins sheet 73)
ANTLERS
(county seat)
Big Rocks
Ethel
KIAMICHI RIVER
Beaver Creek
Dunning Creek
SEWAGE DISPOSAL
SAN FRANCISCO
1 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

N

R. 17 E. | R. 18 E.

T. 3 S. | T. 4 S.

2 760 000 FEET

95°22'30"

34°15'

340 000 FEET

(Joins sheet 62)

(Joins sheet 68)

(Joins sheet 70)

330 000 FEET

34°12'30"

95°30'

(Joins sheet 74)

2 790 000 FEET

KIAMICHI RIVER

Duck Creek

Big Waterhole Creek

Lick Branch

Rock Creek

Fish Creek

Nelson Br

LAKE OZZIE COBB

Possum Creek

Glade Creek

Rocky Branch

Mile Cr

Hog Cr

Scale 1:24000

5000 4000 3000 2000 1000 0 5000 10000 Feet

1 3/4 1/2 1/4 0 1 2 Miles

N

95°22'30"
34°15'

R. 18 E. | R. 19 E.

(Joins sheet 63)

R. 19 E. | R. 20 E.

2 830 000 FEET

T. 4 S. | T. 3 S.

340 000 FEET

(Joins sheet 69)

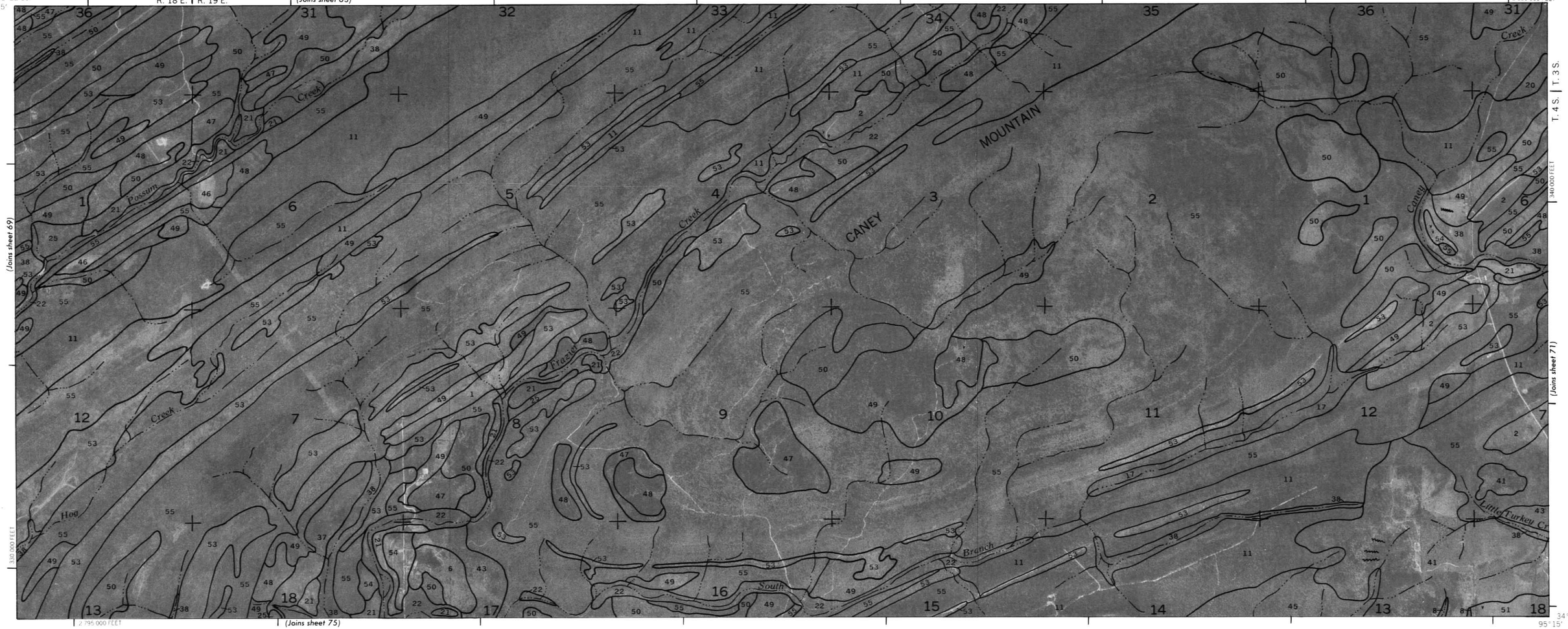
(Joins sheet 71)

330 000 FEET

2 795 000 FEET

(Joins sheet 75)

34°12'30"
95°15'



1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24000

N

95°45'
34°12'30"

(Joins sheet 67)

R. 15 E. | R. 16 E.

2 715 000 FEET

325 000 FEET

(Joins inset A, sheet 66)

T. 4 S.

(Joins sheet 73)

315 000 FEET

Dumpling Creek

Lamey Slash

Dumpling Creek

Charlie Creek

(Joins sheet 77)

2 685 000 FEET

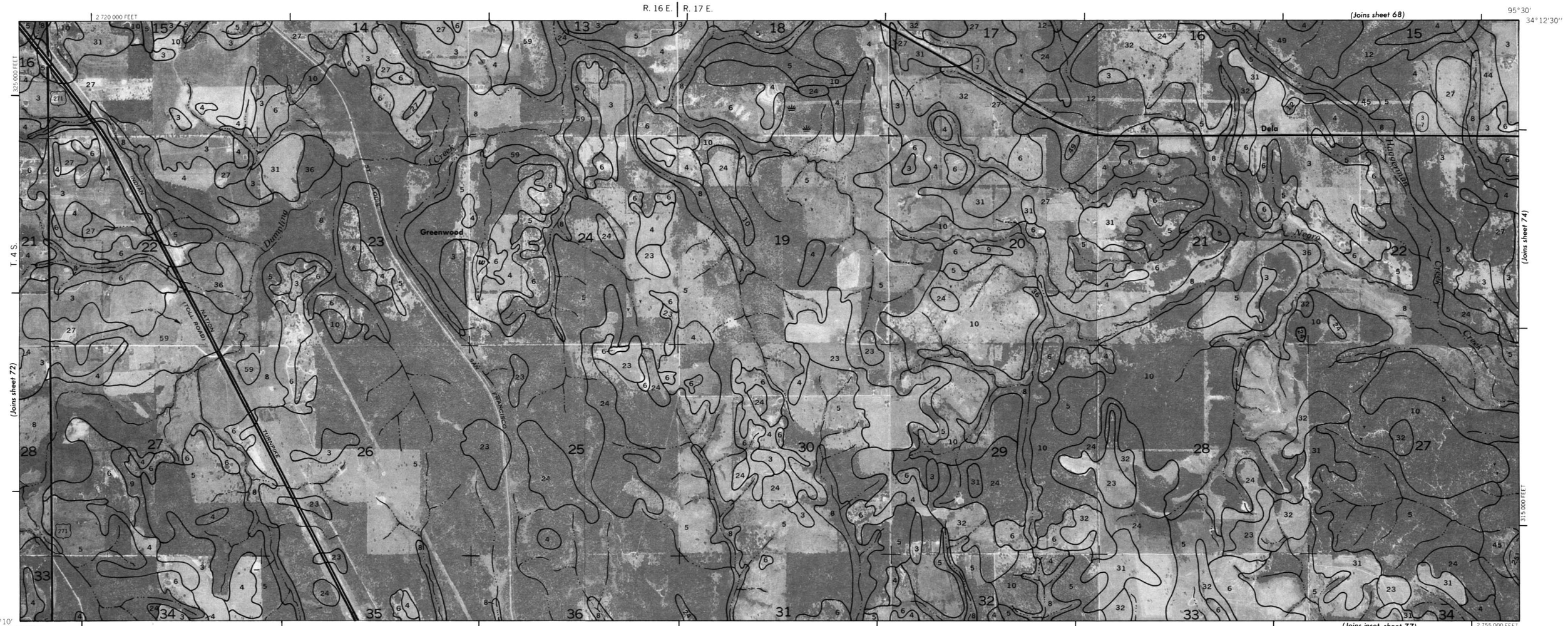
34°10'
95°37'30"

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000

N



1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000

N

95°30'
34°12'30"

R. 17 E. | R. 18 E.

(Joins sheet 69)

2 790 000 FEET

325 000 FEET

T. 4 S.

(Joins sheet 73)

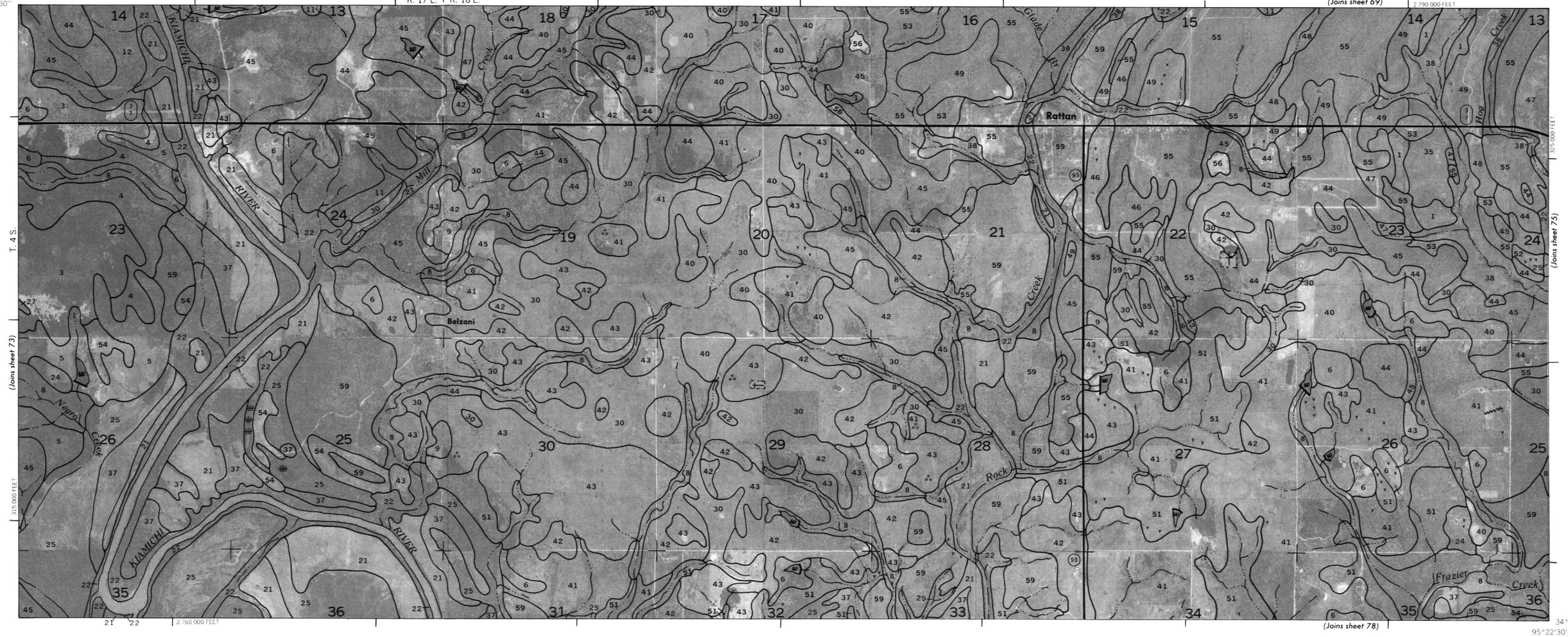
(Joins sheet 75)

315 000 FEET

2 760 000 FEET

(Joins sheet 78)

34°10'
95°22'30"



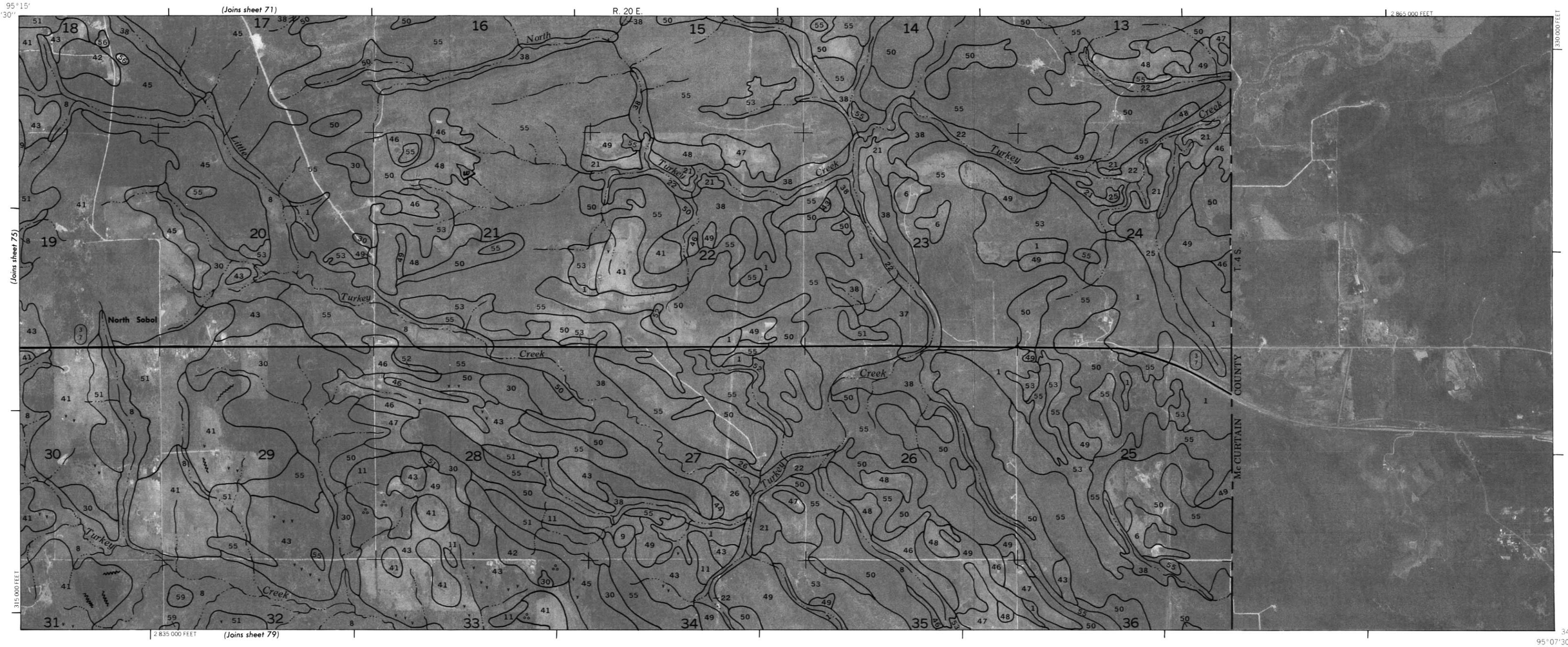
1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000

N

Scale 1:24000



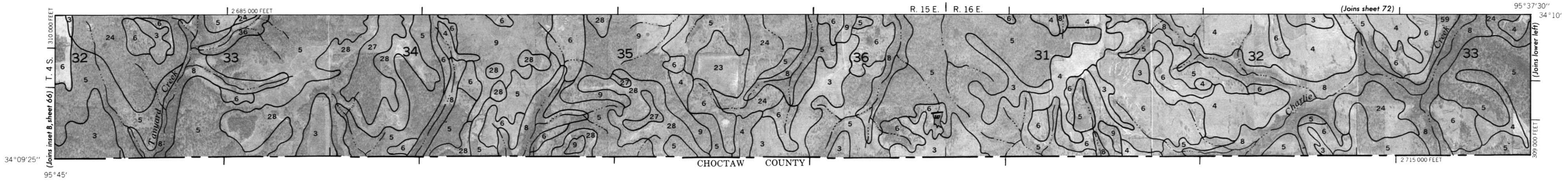
1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

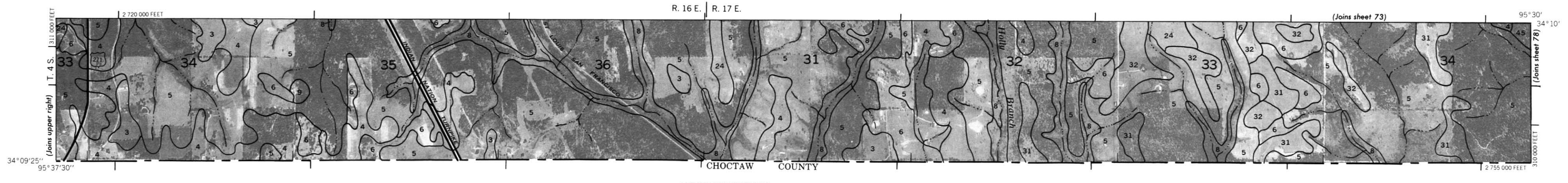
Scale 1:24000

77

N



1000 AND 5000-FOOT GRID TICKS



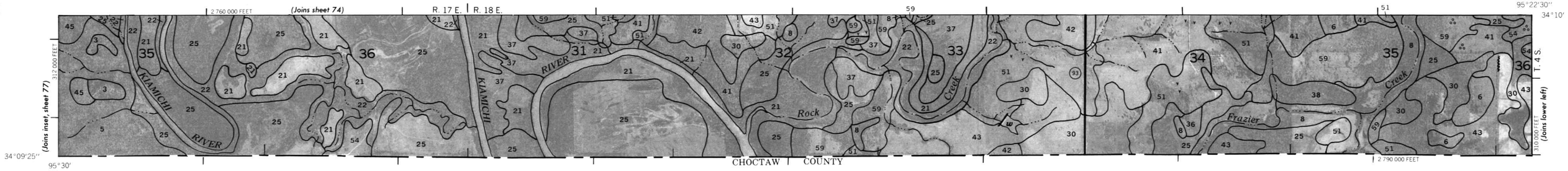
1000 AND 5000-FOOT GRID TICKS

1 ¾ ½ ¼ 0 1 2 Miles

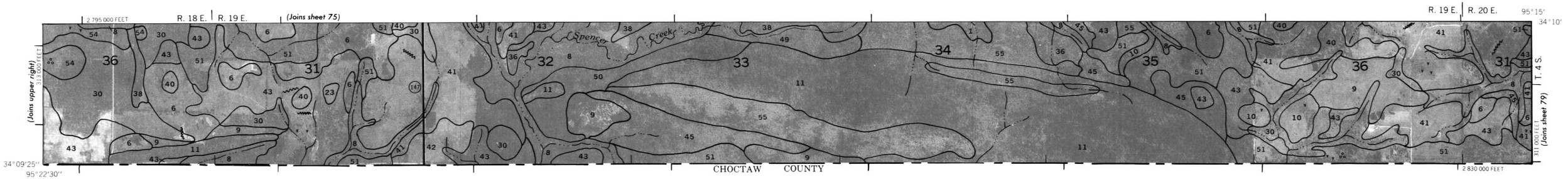
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24000

N



2000 AND 5000-FOOT GRID TICKS



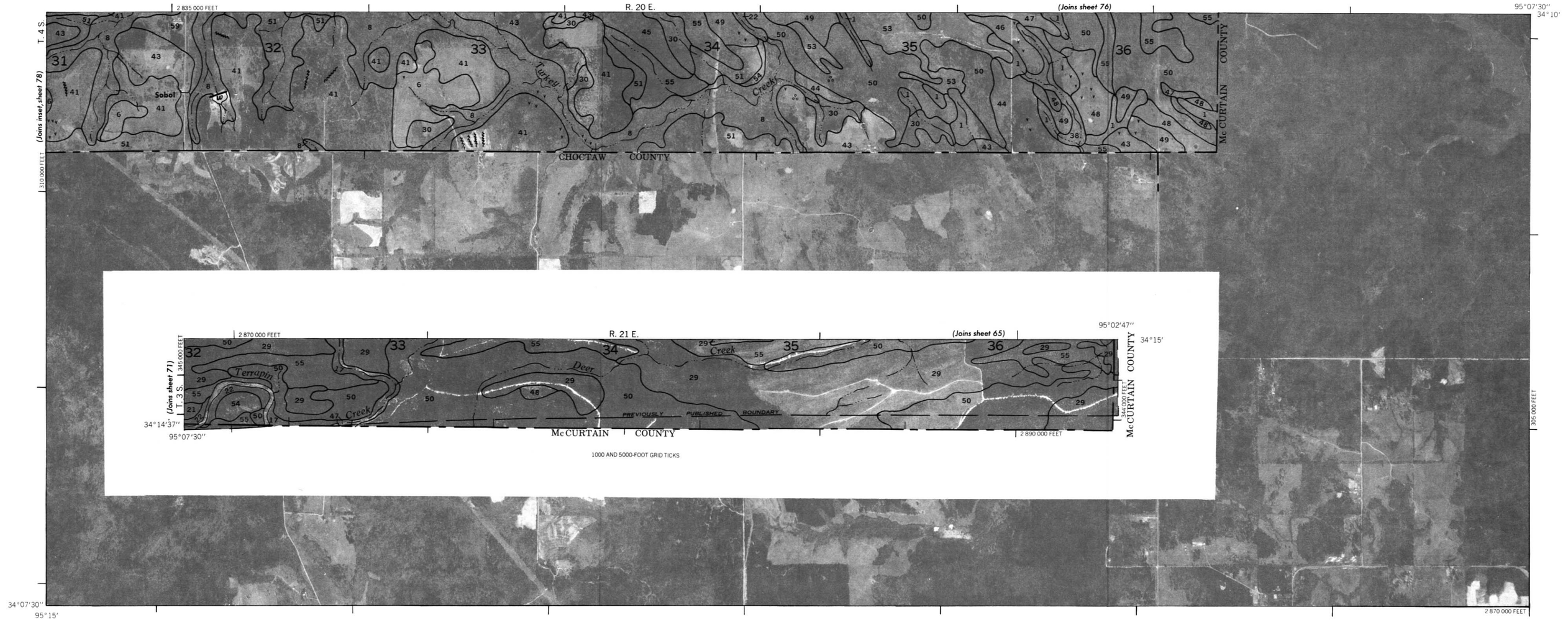
2000 AND 5000-FOOT GRID TICKS

1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24000

N



1 ¾ ½ ¼ 0 1 2 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet

Scale 1:24 000